D A Kugel
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The Stout Institute Bulletin

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1913-1914

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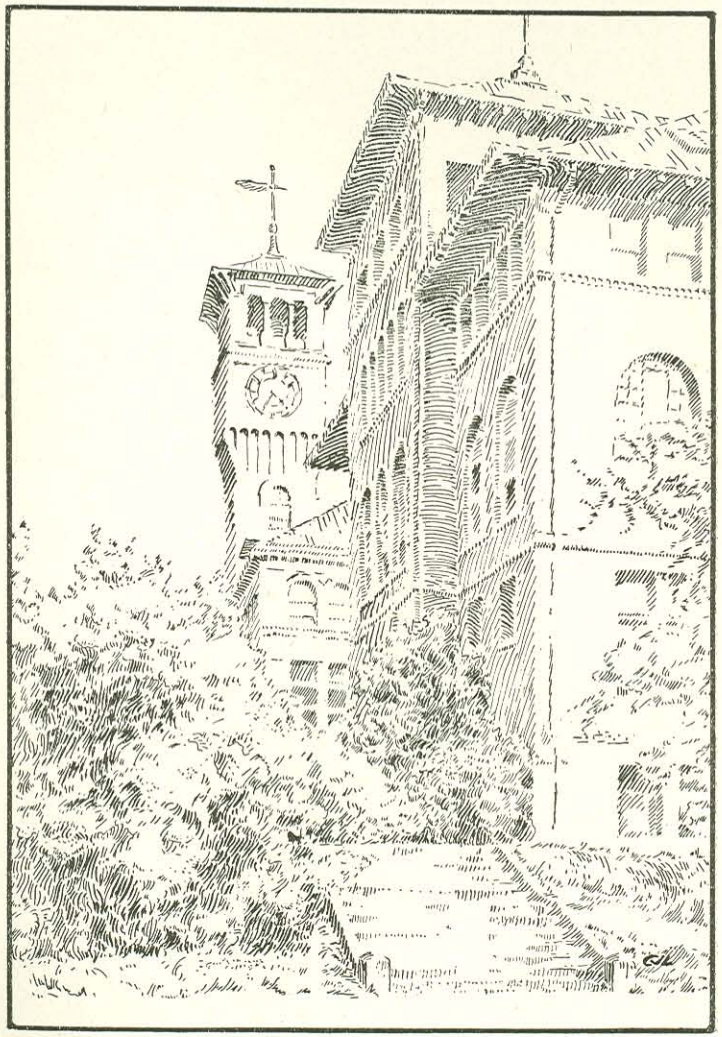
THE STOUT INSTITUTE BULLETIN

ANNOUNCEMENT
1913-1914



Vol. VIII March 1913 No. 1

THE STOUT INSTITUTE BULLETIN

OFFICERS AND FACULTY
GENERAL INFORMATION FOR 1913-14
THE MANUAL TRAINING DEPARTMENT
HOME ECONOMICS DEPARTMENT
HOMEMAKERS SCHOOL
TRADES SCHOOL

PUBLISHED QUARTERLY BY THE STOUT INSTITUTE
AT MENOMONIE, WISCONSIN

THE STOUT INSTITUTE

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THE STOUT INSTITUTE BULLETIN

The Bulletin is issued four times during the year:—March-June-September-December.

It covers the application of the principles of technical and household arts and sciences to public school conditions and indicates how these subjects are being developed in Menomonie.

The subscription price is fifty cents per year. Sample copies will be sent upon request.

CALENDAR FOR 1913

Eighth Annual Summer Session begins July 28, 1813
Eighth Annual Summer Session ends August 29, 1913

Eleventh Regular Session begins September 8, 1913
Holiday vacation—December 20, 1913-January 4, 1914
First semester ends January 23, 1914
Second semester begins January 26, 1914
Spring vacation—March 28, 1914-April 5, 1914
Eleventh Regular Session ends June 5, 1914

ANNOUNCEMENT

FOR THE ELEVENTH ANNUAL SESSION OF

THE STOUT INSTITUTE

MENOMONIE, WISCONSIN

1913-1914

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FACULTY

INSTRUCTORS FOR THE REGULAR SCHOOL YEAR

L. D. Harvey, Psychology and Pedagogy

Milton College, B. A., 1872; Ph. D., 1898. High school principal, 1873-1879; city superintendent, 1880-1885; normal schools, 1885-1888; state superintendent, 1889-1902; superintendent Stout Training Schools, 1903-1908; president Stout Institute, 1908-

George Fred Buxton, Organization of Manual Training, Drawing and Design

Pratt Institute, 1899; Teachers College, Columbia University, bachelors diploma in education, 1904; B. S., 1908; University of Wisconsin, summer sesson, 1908. Teacher of manual training, Newark, New Jersey, 1899-1901; Portland, Maine, 1901-1903; Springfield, Massachussetts, 1904-1905; Ohio State University, summers, 1909-1910; director manual training department, Stout Training Schools, 1905-1908; Stout Institute, 1908-

F. F. Hillix, Machine Shop Practice

Purdue University, 1904-1905; special student and instructor, Purdue university, 1905-1910. Eight years practical experience in the metal trades. Instructor machine shop practice, Evansville, Ind., manual training school, 1910-1911; Stout Institute, 1911-

Louis F. Olson, Carpentry, Architectural Drawing

Stout Institute, 1906; graduate work Stout Institute, 1907. Three years practical drafting, carpentry, and contracting; teacher of forging and mechanical drawing, Stout Institute, 1907-1908; director of manual, training public schools, Madison, Wis., 1908-1911; teacher of drafting and shop work, summer sessions, Kansas State Manul Training Normal School, 1909, Stout Institute, 1907, 1910, 1911; Stout Institutee, 1911-

R. H. Chandler, Joinery, Pattern Making, Foundry Work

Apprentice Cushman Electric Co., Concord, N. H., 1905-1908; pattern maker Amoskeag Manufacturing Co., Manchester N. H., specialist in pattern making, Blake & Knowles, Steam Pump Works, Boston, Mass., 1909; job shop pattern making, 1910-1911; instructor in manual training, West Virginia University, 1911-1912; Stout Institute, 1912-

Fred L. Curran, Elementary Woodwork, Upper Grade Woodwork

State Normal School, Stevens Point, Wis., 1905; Stout Institute, 1908; Bradley Polytechnic Institute, summers, 1908, 1909. Teacher in public schools, 1898-1903; principal state graded schools, 1905-1907; Stout Institute, 1908-

H. H. Hansen, Cabinet Making, Mill Work

Fourteen years' experience in mill work and as pattern maker, carpenter and draftsman; Stout Institute, 1912-

R. F. Jarvis, Blacksmithing

Shop work, 1905; University of Missouri, B. S., 1912. Assistant in engineering shop work, University of Missouri, 1906; instructor manual training, Birmingham, Ala., 1907-1911; assistant in manual training, University of Missouri, 1911-1912; Stout Institute, 1912-

A. H. Brown, Wood Finishing

Ten years' experience as journeyman painter and decorator; ten years' experience in wood finishing in piano factory, automobile and carriage shops. Stout Institute, 1913-

Henry Grubert, Wood Turning

Served apprenticeship in German wood turning shops; fifteen years' experience in all grades of wood turning; six years' experience in turning hard rubber, bone, ivory, and amber; five years' experience as shop manager. Stout Institute, 1913-

Chas. E. Eslinger, Printing, Primary Handwork

Stout Institute, 1912. Four years' experience as practical printer; teacher of printing and primary handwork, Stout Institute, 1912-

H. W. Jimerson, Pumbing and Gas Fitting

Journeymen and contractor, 1884-1904; director Minneapolis School of Plumbing, 1904-1908; director plumbing trade school, Stout Institute, 1908-

Wm. T. Gohn, Bricklaying, Cement Work

Williamson School of Trades, 1907-1910. Journeyman bricklayer, 1910-1911; director bricklaying trade school, Stout Institute, 1911-

J. O. Steendahl, Mechanical Drawing

Stout Institute, 1905. Director manual training, La Junta, Colorado, 1905-1906; State College of Idaho, Pocatello, Idaho, 1906-1910; instructor mechanical drawing, Portland School of Trades, Portland, Oregon, 1910-1912; Stout Institute, 1912-

O. C. Mauthe, Physical Training

Normal School of North American Gymnastic Union, Milwaukee, 1895; Harvard University summer school of physical training, 1897; Chautauqua, N. Y., summer school, 1899; Gilbert Normal School of aesthetics and social dancing, Boston, summer, 1904. Physical director, Turnverein Vorwaerts, Milwaukee, 1895-1896; West Minneapolis Turnverein, Minneapolis, 1896-1899; special instructor, Harvard University, summers, 1898, 1902, 1903; physical director, Dayton Turngemeinde, and Young Women's League, Dayton, O., 1899-1903; physical director, Shreveport Athletic Association, Shreveport, La., 1903-1909; supervisor of games, Dayton vacation schools, 1903; supervisor of playgrounds, Shreveport, La., 1905-1909; physical director, Stout Institute, 1909-

Daisy A. Kugel, Organization of Domestic Science, Household Management

University of Michigan, A. B., 1900; Teachers College, Columbia University, B. S., 1908. Teacher in public schools, 1902-1906; Stout Institute, 1909-

Clara Louise Boughton, Advanced Cookery, Junior Cookery, Food Study

State Normal School, Milwaukee, 1890-1893; Stout Institute, 1909-1910. Teacher in public schools, Manitowoc, 1893-1909; director domestic science, Racine, 1910-1911; Stout Institute, 1911-

Lucy Cordiner, Senior Cookery, Dietetics, Physiology

State Normal School, Winona, 1893; University of Wyoming, A. B., 1905; graduate student, University of Chicago, 1907-1908, and summer session, 1911. Teacher public schools, Laramie, Wyoming, 1893-1902; critic teacher, Central normal school, Edmund, Oklahoma, 1902-1904; supervisor domestic science, Ishpeming, Michigan, 1908-1912; Stout Institute, 1912-

Bertha Bisby, Dietics, Junior Cookery

Kansas State Normal, 1893-1894; University of Chicago, summer session, 1908; Stout Institute, 1910-1912. Teacher public schools, Alma, Kan., 1900-1903; Manhattan, Kan., 1903-1908; teacher of mathematics, Kansas State Agricultural College, Manhattan, Kan.; Stout Institute, 1912-

Jennie A. Humphrey, Food Study, Junior Cookery

Teachers College, Columbia University, 1908. Teacher of domestic science, State Industrial School for Girls, Adrian, Mich., 1908; assistant in domestic science, Winthrop College, Rock Hill, S. C., 1908-1909; assistant in domestic science, Kansas State Agricultural College, Manhattan, Kan., 1910-1911; Stout Institute, 1912-

Clara G. Turner, Dietetics, Senior Cookery

Normal School, Fredrickson, N. B., 1902; Mt. Allison Ladies' College, N. B., 1906; Teachers College, Columbia University, B. S., 1912. Teacher in public schools, New Brunswick, 1903-1904; teacher of domestic science, consolidated schools, New Brunswick, 1906-1911; Stout Institute, 1912-

Lenna G. Baker, Physiology, Home Nursing

State Normal School, Whitewater, 1907; Stout Institute, 1910. Teacher in public schools, 1907-1909; teacher, domestic science, high school, Everett, Washington, 1910-1911; Stout Institute, 1912-

Louise Phillips Glanton, Supervision of Practice Teaching, Plain Sewing

Harlie College, Rome, Ga., A. B.; Columbia University, B. S., and diploma Teachers College. Critic, third grade, Speyer school, Teachers College, 1902-1908; superintendent Nassau industrial school, Lawrence, Long Island, 1909-1910; director domestic science department, public schools, Montgomery, Ala., 1910-1912; Stout Institute, 1912-

T. R. Moyle, Chemistry

Lawrence College, B. S., 1899; M. A., 1912; Chicago University, 1909-1910. Teacher, Meuston, Wis., high school, 1899-1901; Sparta, Wis., high school, 1901-1903; Appleton, Wis., high school, 1905-1909; Menomonie, Wis., high school, 1910-1911; Stout Institute, 1911-

Mabel H. Leedom, Chemistry

City Normal School, Dayton, Ohio, 1894; Stout Institute, 1910. Teacher in public schools, Dayton, Ohio, 1895-1905; Stout Institute, 1910-

Mary M. McCalmont, Chemistry

West Minister College, New Wilmington, Pa.; graduate student, University of Omaha, Neb., 1911; University of Wisconsin, 1911-1912. Teacher in public schools, 1906-1907; principal of high school and supervisor of music, Woodville, Ohio, 1907-1909; city schools, Omaha, Neb., 1909-1911; Stout Institute, 1912-

Louise Williams, Biology

McGill University, 1907; B. A. and diploma from McGill in the teaching of biological science, Teachers College, 1911. Teacher of classics and science, Dunham College, Quebec, 1907-1909; Stout Institute, 1911-

Muriel Speller, Textiles, Plain Sewing, Dressmaking

Pratt Institute, 1903-1905; diploma in domestic art, Teachers College, Columbia University, 1907; B. S., 1911; teacher, Macdonald Institute; Guelph, Ont., 1905-1906; Technical high school, Springfield, Massachussetts, 1907-1910; Stout Institute, 1911-

Elizabeth A. Lathrop, Art Needlework, Textiles, Primary Handwork

Boston School of Domestic Science, 1905; Teachers College, Columbia University, 1910. Teacher of domestic art, Atlanta University, Atlanta, Georgia, 1905-1908; Stout Institute, 1910-

Anna McMillian, Cookery, Primary Handwork

Stevens Point Normal, 1899; Stout Training Schools, 1908. Grade teacher, 1899-1905; teacher of domestic science, Stevens Point Normal School and Grand Rapids, Wis., public schools, 1908; Stout Institue, 1909-

Banche W. Stevens, Trade Dressmaking, Model Sewing

Domestic art, Minnesota State University, summer session, 1906; academic, Hamline University, 1907-1910; Stout Institute, 1910-1912; domestic art, Teachers College, summer session, 1912. Teacher in domestic art, Bethel Industrial School, 1906-1907; trade experience in Twin Cities, 1902-1907; Stout Institute, 1912-

Ella G. McCauley, Millinery, Art Needle Work

Student Stout Institute, Summer Session 1911, regular session 1911-1912. Ten years experience as designer and trimmer in wholesale millinery establishments; instructor in millinery, Stout Institute, 1911-

Josephine W. Hobbs, Cooking, Model and Plain Sewing

Cook County, Illinois, normal school, summers, 1894-1897; Boston School of Domestic Science, 1907. Teacher in public schools, Dubuque, 1898-1906; supervisor domestic Science and matron Moore Street Neighborhood House, Cambridge, Massachussetts, 1907-1908; superintendent, Y. M. C. A., Training School for Household Service, Boston, 1908-1909; director, Homemakers School, Stout Institute, 1909-

Grace R. Darling, Home and Social Economics

University of Michigan, 1884; Teachers College, Columbia University, 1892; Wisconsin Library School, Madison, Wisconsin, 1907. Teacher of history and literature, State Normal School, Oshkosh, Wisconsin, 1884-1891; teacher of history and literature, State normal school, Milwaukee, Wisconsin, 1895-1903; Stout Institute, 1908-

Ruth Mary Phillips, English

University of Wisconsin, B. A., 1904; graduate work, University of Wisconsin, summer session, 1905, and one semester, 1909. Teacher in high school, Lodi, Wisconsin, 1904-1905; teacher in high school, Black River Falls, Wisconsin, 1906-1910; Stout Institute and Menomonie high school, 1910-

Mary I. McFadden, Psychology

State normal school, Oshkosh, 1897; University of Wisconsin, Ph. B., 1900; A. M., 1907; University of Chicago, Ph. M., 1901; Teachers College, Columbia University, January 1908-June 1908. Teacher, Grand Rapids high school, 1891-1892; principal, Menomonee Falls high school, 1892-1893; assistant principal, Oconto high school, 1893-1895; associate supervisor of practice. Oskosh normal school 1901-1906; acting assistant professor of education, University of Kansas, one semester, 1906-1907; principal Muskegon City normal school, 1908-1910; supervisor of practice, teacher of pedagogy and music, Sauk County Training school, 1911-1912; Stout Institute 1912-

_____, Interior Decoration and Furnishing, Freehand Drawing

To be filled.

Alma Krueger, Physical Training

Normal college, North American Gymnastic Union, Indianapolis, Ind., 1911; Stout Institute, 1911-

GENERAL INFORMATION

LENGTH OF COURSE

Courses leading to the diploma granted by each of the training schools for teachers require two years' work. No diploma will be issued to any person who has not been a student in residence for at least one year. Upon the completion of one of these courses,—Manual Training or Home Economics,—a diploma is issued, which by statute, is made the basis for the issuance of a life certificate, after two year's successful teaching in Wisconsin.

This certificate legally qualifies the holder to teach the subjects in which training has been taken, in the public schools of the state. The certificate is issued by the State Board of Examiners and is accepted in most of the other states.

QUALIFICATIONS FOR ADMISSION

Graduation from a four year's high school course, or equivalent preparation, is required for admission to each of the training courses. The candidate must be at least eighteen years of age, and must be possessed of good health and physical energy, of refinement and good character. Testimonials of good character are required.

Students who have had normal or collegiate training are given credit for such of the required work in the Institute courses as they have satisfactorily mastered. Successful experience in teaching before entering Stout Institute, in most cases, reduces the amount of practice teaching required of the student.

ADVANCE ENROLLMENT

School accomodations limit the number of students who can be enrolled; for this reason persons who wish to enter should make application in advance for an enrollment blank, which should be filled out and forwarded to the school with physician's certificate, and two certificates of good character. Enrollment is made in the order of application.

THE DEMAND FOR GRADUATES

The demand for the graduates of Stout Institute as teachers of manual training and domestic economy is steadily increasing year by year. At the present time they are teaching or doing supervisory work in twenty-seven states and in Canada.

The number of schools in which manual training and domestic art and science are being taught is rapidly increasing and the demand for well trained teachers of these subjects is greater than ever before.

The officers of the Institute are glad to recommend teachers to school officials who are seeking competent teachers of manual training and domestic art and science. In making recommendations every effort is made to name candidates who by training, temperament, personality, and experience

are adapted to the demands of the position to be filled. The more complete and definite the information furnished as to the kind and amount of work required, and the salary to be paid, the better they are prepared to select the person most likely to give satisfactory service. They prefer to make no recommendation unless they feel confident that they can name a candidate who will succeed.

THE SUMMER SESSION

Stout Institute Summer Sessions offer exceptional opportunities for supervisors or special teachers of manual training, domestic art and science, or freehand drawing to advance themselves along their special lines, either in technique or alongthe professional side. Superintendents and principals are finding in these summer sessions an opportunity for learning something of the content and method of school handwork. Grade teachers are perfecting themsleves in handling special subjects through summer courses.

Provision is made for outings aud games so that a vacation may be combined with a summer course of study.

Sixty-eight courses are offered in the summer of 1913. The session opens July 28 and closes August 29. The December number of the Bulletin gives full information concerning the courses offered in the summer session.

SCHOOL EXPENSES

Tuition is one hundred dollars per year, one-half payable at the beginning of each semester. A fee of fifteen dollars per year is charged to cover the cost of materials used by the students in the manual training department. Students taking work in any courses not required for graduation, are charged an additional fee to cover actual cost of material used in such courses.

Board and room can be obtained at prices ranging from four and a half to six dollars per week in private families.

LABORATORY FEES

In the science courses minimum fees are charged for aboratory work. The fees for the regular course are as follows:

General Chemistry	$5.00
Food Chemistry and Chemistry of Cleaning	2.50
Bacteriology	5.00
Chemistry of Nutrition	5.00
Food Adulteration	2.50
Junior Cookery (per semester)	4.00
Advanced Cookery (per semester)	4.00
Dietetics	1.50
Model Sewing	1.00
Plain Sewing	1.00
Dressmaking (per semester)	1.00
Millinery and Art Needlework	1.00
Primary Handwork	1.50

In addition to the laboratory fee, students are expected to pay for any breakage which may occur.

LIBRARY AND READING ROOM FEES

A fee of five dollars, payable at the opening of the school year is required of each student.

All necessary text books are furnished from the loan text book library for the school year without any extra charge to students.

The reference library is supplied with standard reference books needed to supplement the text books in different subjects and with educational and technical periodicals adapted to the needs of the students.

REFUNDS

Students who are compelled to withdraw from the Institute by reason of illness are entitled to a refund of tuition from the date when notice is received of such withdrawal, to the end of the semester.

Students boarding in the dormitories are also entitled to a refund of whatever amount has been advanced for board beyond the date when notice is received of withdrawal. Refund for advance payment for room rent in the dormitories is allowed from the date when the room is again rented, and effort is made to secure an occupant at the earliest date possible. As books and supplies for which fees are charged have to be bought in advance in quantities necessary to supply the entire enrollment no refund of library fees is made in any case.

UNIFORMS

Young women attending the Institute are required to wear uniforms during the daily sessions. Men are required to wear white overalls and jumpers in the woodworking shops and brown overalls and working shirts in the metal working shops.

A gymnasium suit is required of each student taking physical training. This work is optional for students in the home economics department. It is required for all men in the manual training department.

Special information regarding uniforms and gymnasiam suits for women is sent to prospective students upon application.

DORMITORIES

Bertha Tainter Hall accommodates about thirty young ladies. The Hall is furnished with all modern conveniences, the rooms are electric lighted, and heated both by direct and indirect radiation, thus assuring ample heat and good ventilation. A large reception room, a music room, and a reading and study room for those who may prefer to study there rather than in their rooms, are provided. The hall is three blocks from the school grounds, overlooks Lake Menomin, and is in the midst of spacious, well-kept, well-wooded grounds. It is the aim to make this an ideal home for such students as wish to avail themselves of its accomodations. The hall is in charge of a woman of experience and culture, and such regulations and supervision are maintained as insure proper conditions for health, effective work, and the proper social life of students.

Tainter Annex accomodates fifty young ladies and is situated on the same grounds with Bertha Tainter Hall. It is thoroughly suited to the purposes for which it is planned. It has a large central living room with two balconies and skylight above, making an attractive place for rest and social activities. The rooms are all arranged in suites of study and sleeping room, each suite for two students. A large dining room in Bertha Tainter Hall provides meals for students in both halls.

The charge for room for the school year for each student is sixty to eighty dollars according to the size and location of the room. In most cases the lower rate prevails. The charge for meals and a definite amount of laundry work for each student rooming in the Halls is four dollars and fifty cents per week. The amount of laundry work done under the above arrangement is the average amount each student requires weekly. A list of the different articles laundered weekly without additional charge is furnished each student. Articles not included in this list are laundered at a reasonable rate at the Institute laundry.

HOMEMAKERS DORMITORIES

Two cottages furnishing home accomodations for sixteen students are provided for the students taking the Homemakers course. The cost for room and board is the same as in the Halls.

SCHOOL YEAR

The school year is thirty-six weeks in length, beginning September 8, 1913, and ending June 5, 1914. Students should arrange to enter at the beginning of the school year if possible. When this is not possible students may enter at the begininng of the second semester.

The summer session is five weeks in length, beginning July 28, 1913, and ending August 29, 1913.

Address all correspondence regarding courses of study or general work of the Institute to

L. D. HARVEY,
President Stout Institute,
Menomonie, Wisconsin.

MANUAL TRAINING DEPARTMENT

COURSES OF STUDY FOR 1913-1914

The manual training department offers courses for teachers of manual training and vocational subjects in public schools. These courses are two years in length and furnish students an opportunity to get the broad range of work in demand in the smaller school systems or give them a chance to specialize in certain groups of work. There is an increase in demand for this specialization and in order to meet the call for teachers a number of changes are being made from courses offered in former years.

ADJUSTMENT OF MANUAL TRAINING COURSES TO MEET THE DEMAND FOR SPECIALISTS

Beginning September, 1912, the Stout Institute began the adjustment of its courses to meet the increasing demand for teachers of various lines of industrial education aiming more specifically at preparation for vocations.

While not abandoning its former purpose of meeting the usual demand for teachers of manual training in elementary and secondary schools as they exist in the typical community, a beginning has been made in the training of teachers to handle single lines of work where such specialization is demanded.

The demand, for several years, has required that teachers of drawing and shop work should be able to teach both architectural and mechanical drawing, several lines of woodwork, and one or two lines of metal work. In order to handle these subjects with any degree of satisfaction a large amount of time must be spent in preparation for such a wide range of activities. In many cases the schools have been unable to meet this situation adequately and many teachers of manual training have been only partially trained for certain of the branches which they must teach.

It is evident that an increasing number of communities are demanding more thorough work in a more limited field than heretofore. This demand can only be met by furnishing prospective teachers with fuller opportunities for specialization.

Such work falls naturally into two main groups; those which aim specifically at the building trades, and those which aim at the machine trades. The courses offered at the Stout Institute for the school year 1913-1914 are arranged to meet this demand. New equipment has been added and extra teachers engaged to provide for thorough work in one or more branches falling naturally into the groups just noted.

As a preparation for the building trades, courses are offered in architectural drawing, carpentry, mill work, cabinet making, plumbing, and masonry. The architectural drawing is eminently practical and concerns itself especially with details of construction and complete working plans for simple frame buildings. The course is closely related to the course in carpentry which requires the building of actual cottages. In one or more cases, the cottages

will be completely fitted with the necessary chimneys, fire-places and all plumbing connections. While the students in carpentry are given this opportunity to carry out practical work they will also concern themselves with such exercises, arranged in definite sequence, as shall give each individual an adequate understanding of the fundamental principles which the carpenter in nearly every instance must meet. Lecture work, notes, references, and visits to such building operations as may be available in the vicinity will give the course a somewhat broader basis for its limited field of work.

The cabinet making course is in part, closely related to the carpentry and requires the making of such interior woodwork and built-in cases as are common in connection with house building. Students wishing to give their time more to the making of pieces of furniture may also find the work suited to their needs.

The plumbing course will continue as it has done for several years to carry out various exercises involving the important details with which the plumber is concerned, the repair work and installation of plumbing in the many Institute buildings, and will also be correlated with the carpentry course in the complete fitting out of fixtures for the cottages to be built by the students taking this work.

Bricklaying and cement work furnish a furthur opportunity for adaptation of details of these trades to the conditions of the public schools.

In the group of machine trades, students are given an opportunity to specialize along one or more of the following lines; machine drawing, pattern making, foundry practice, forging, and machine shop practice. The work in machine drawing and machine shop practice has already begun to take on aspects of specialization, but considerable emphasis will also be given during the coming year to pattern making, foundry practice, and forging. The details of these lines of work are so adjusted that a student may prepare himself to handle any one, or to take charge of such of them as are more closely related either in thought, or in the practical handling of the work of the shops.

Of the lines of the work not directly connected with the building or machine trades, certain ones furnish an opportunity for some specialization. Equipment for printing was installed in 1912 and students are given an opportunity to prepare themselves for teaching this line of work in schools. There is an increasing demand for printing as a branch of the school arts and it is believed that it is to have a large future in the development of industrial education. While the school offers the branch as one among many lines for the teacher who is to handle several branches, it also offers facilities for specialization.

Those who are planning to teach in elementary schools will find as heretofore, fundamental work offered in freehand and mechanical drawing, manual training design, elementary woodwork, joinery, wood turning, primary handwork and special shop work.

In addition to these lines students may elect printing or cabinet making or any of the subjects which have been mentioned as parts of the new groups of industrial courses.

The aim is to strengthen the work in this department by offering more extended courses in a number of lines than heretofore. Students will in many cases be advised to elect several related branches but all of the re-

sources of the school will be available to allow students a chance to do intensive work in the line to which they may care to give their attention.

PSYCHOLOGY AND PEDAGOGY

This work is taken at the beginning of the junior year and is limited to a consideration of principles, fundamental in character, and to the application of these principles in the actual work of teaching. Time does not permit the study of psychology as a culture subject. The students who have so studied it, but have not given consideration to the application of its fundamental principles in teaching, will need to take the prescribed course.

Special attention is given to the psychology of attention, habit, and will. Those principles of pedagogy are considered which may be shown to have a practical application in the teacher's work. In the academic, shop, and laboratory work, it is the aim of the teacher not only to have the students master the special work under consideration, both from the academic and technical standpoints, but at the same time to consider the work from the standpoint of the teacher. Practical exercises are given throughout the course requiring a conscious application by students in their work of the psychological and pedagogical principles studied.

OBSERVATION AND PRACTICE TEACHING

During the senior year students are required to systematically observe the work of experienced teachers in conducting classes in their respective lines of work in the public schools. The observation work is under the direction of members of the training school faculty. The observation required is not simply a "looking on;" the teachers in charge direct the attention of the observers to definite aims, methods, and results.

Methods of different teachers in the instruction and contol of classes are studied, not to be copied, but to determine how far they are based on sound pedagogic principles. The work under observation is discussed by those observing and the teachers in charge of the observation classes. Weaknesses are pointed out and the reason for the weakness shown from a pedagogic standpoint. The strong work is noted and the reasons for its strength discussed. The aim is to make students familiar with the application of psychological and pedagogical principles through a careful observation of the various ways in which these principles are applied by different teachers in different phases of the work. After the observation work has been continued for a reasonable time, students are put in charge of classes and are given practice in teaching in different grades. Before beginning practice teaching in any grade, students are required to thoroughly familiarize themselves with the work outlined in the course of study offered for that and lower grades and by observation of the class, to determine what progress has been made in the course and what are the next steps in order. Before taking charge of the classes, they are required to prepare definite plans indicating the proper order of procedure. The practice teaching is done under the supervision of the special teacher of the particular line of work in which the instruction is given. In class work of the regular teachers in the training schools, an effort is made to bring into the consciousness of the students the pedagogical principles upon which the work there is based.

ORGANIZATION OF MANUAL TRAINING

This course is planned to cover problems in the organization and teaching of manual training in the public schools. It covers the theory of education and its application to manual training, the qualifications and opportunities of the special teacher, methods of teaching manual training, problems in administration and supervision of a special department, a study of the subject matter of manual training courses and details of equipment and costs of

maintenance of a manual training department. Lectures, discussions, assigned readings and reports make up the work of the course.

1. Theory of Education
   Scope of manual training, physical education, mental training, English teaching, breadth of outlook, art training, and social efficiency.
2. Place of Manual Training in School Systems.
   Relation of the manual training department to other features of the school system. Sources of control, matters of school expenditure, school administration. Special elementary and secondary industrial and technical schools. Development of high school studies and advanced trade instruction in vocational lines of work. Relation between manual training and vocational education.
3. The Special Teacher.
   Technical and professional training, personality, the teacher's work as a student, prospects for advancement for the special teacher.
4. Methods of teaching.
   The making of teaching plans, care of tools and supplies, preparation for lectures and demonstrations, presentation of lessons, class procedure, conveniences in teaching, control of classes, the holding of proper standards.
5. Supervision of Manual Training.
   The selection and training of special teachers, conducting teachers meetings, the keeping of records, general office work, the making of reports, relation of the supervisor to teachers and superintendent.
6. Planning of Courses and Shops.
   Formulation of purposes. Arrangement of courses and plans for school shops. Analysis of subject matter arranged by grades, primary hand work, upper grade shop work, high school courses, mechanical and free hand drawing, art crafts work, vocational courses.
7. Equipment and Maintenance.
   Kinds, quantities, and costs of tools, benches, cabinet work, miscellaneous supplies. Selection and installation of equipment for various lines of school work. Arrangement of shops, planning of equipment, lighting, storage of supplies, consideration of economy in the purchase of a school outfit.
8. Tendencies and Outlook.
   A brief review of the growth of the subject leads to a study of the present situation regarding manual training and technical education and to an examination of the tendencies and outlook.

HISTORY OF MANUAL TRAINING

The aims of this course are: (a) to trace the adjustments of the schools to changing social needs; (b) to follow the growth of manual training movement; (c) to get broad view of educational history and of manual training; (d) to establish a basis for an understanding of the present educational and industrial needs; (e) to study the present conditions in order to determine what forms of industrial education are needed.

The work of the course is carried on thru assigned lessons from various references; thru lectures and discussions; and by preparing written reports on outside readings. The following topics indicate the scope of the work.

Early educational history; Pestalozzi and other reformers and the effects of their work; education in Germany, France and England with reference to industrial education and manual training; the manual labor movement; early work in Russia as led by Uno Cygnaeus and M. Victor della Vos; the work of Otto Salomon and the Sloyd movement; a general survey of manual training and industrial education in Europe; the beginnings and development of manual training in the United States; present conditions of the courses of study in manual training; demands for industrial education and how this involves the manual training work; work of trade, vocational, and technical schools studied and compared

ENGLISH

Presentation of such phases of composition work as will give the student a command, both in speaking and writing, of simple, correct and clean-cut English, is the aim of this course. The special topics considered vary with the needs of particular classes.

In general these topics may be designated as: grammatical forms; sentence structure; choice of words; social and business correspondence; the preparation and organization of literary material.

The work is closely correlated with that in other departments and is based on long and short themes, talks, discussions, and papers presented by members of the classes.

A special feature of the work in English is the training in oral exposition and description. The tools and materials used, processes employed, and products completed in the construction work furnish many of the topics for these exercises. This work is continued throughout the course for the purpose of developing ease, facility, and accuracy in the students' subsequent use of English as a teacher in the class-room.

ELEMENTARY MECHANICAL DRAWING

The course comprises twenty plates of exercises, designed to give the student; (a) skill in the use of drawing instruments; (b) ability in free-hand lettering; (c) a knowledge of geometric construction and orthographic projection; (d) practical experience in making and reading working drawings.

1. Parallel Lines in Pencil.
   Use of T square, rule, triangle, and pencil; sheet lay out, accurate measurements, use of parallel lines.
2. Upper Case Lettering.
   Gothic inclined, three-eighth inch and three-sixteenth inch.
3. Lower Case Lettering.
   Gothic one-fourth inch and one-eighth inch.
4. Parallel Lines Inked.
   Use of ruling pen, method of inking.
5. Conventional Lines.
   Use of 45 degree triangle, ruling pen, hidden line, center line, construction and demension line.
6. Circles and Tangents.
   Use of bow compass, use of large compass, use of center line and concentric circles.
7. Tangent Arcs.
   Use of compass, method of dividing line into equal parts.
8. Geometric Construction.
   Four selected problems.
9. Geometric Construction.
   Four selected problems.
10. Irregular Curve Drawing.
    Practice sheet.
11. Ellipse.
    Application of course, four methods of making the ellipse.
12. Lettering.
    Upper and lower case gothic in ink.
13. Dimension Conventions.
    Lines, arrow heads, and figures.
14. Working Drawing Exercise.
    Application of orthographic projection and dimension lines. Two-viewed drawing.
15. Working Drawing Exercise.
    Application of irregular curve and dimension lines.

16. Working Drawing of Stool.
    Three-view working drawing, drawing to three-sixteenth scale.
17. Step Ladder.
    Two-view working drawing and tracing.
18. Orthographic Projection.
    Sections and true length of lines.
19. Orthographic Projection.
    Sections and developments.
20. Orthographic Projections.
    Geometric solid revolved at angle to H and V planes.

PROJECTION DRAWING

This course is designed to give further information and practice in orthographic projection, practice in the making of working drawings of wood work and machinery, familiarity with the principles of insometric and perspective drawing, training in sketching and tracing.

1. Orthographic projection; intersections; revolved views.
2. Symbols of standard cross sections.
3. Helix and application to V and square threads.
4. Standard bolt and nut, square and hexagonal.
5. Sketch, working drawing and tracing of selected objects.
6. Cams—three designs.
7. Gear blank—proportions and teeth (involute).
8. Bevel gear—cross section and elevation.
9. Working drawing of cabinet—details and assembly.
10. Isometric drawing of cabinet.
11. Perspective diagram.
12. Perspective drawing of cabinet.

MACHINE DRAFTING

This course is made up of twenty plates designed to prepare teachers in high school drawing. The work covers: sketching, working drawings, tracing, elementary machine design, and a study of drafting room methods and conventions. Lectures are given on material of construction, strength of materials, and proper design of machinery.

1. Sketching, use of the pencil, drawing parallel lines.
2. Sketching of circle and arc.
3. Sketching turned working drawing.
4. Sketching of machine part, selection of views, center lines, outlines, details, dimensions.
5. Working drawing from other student's sketch.
6. Helix and application, V and square threads.
7. Standard bolt and nut, square and hexagonal nut.
8. Conventional threads and screws.
9. Standard symbols of materials.
10. Hand wheel from standard proportions.
11. Shaft coupling detail and assembly.
12. Pedestal box bearing.
13. Complete working drawing of machinist's vise.
14. Tracing of assigned school work.
15. Cams and a study of cam motions.

16. Spur gear and pinion, blank proportions, gear teeth design, strength for given work.
17. Rack and pinion. standard proportion.
18. Bevel gear, of rim, hub, spokes.
19. Worm gear, face and web.
20. Internal gear.

ARCHITECTURAL DRAWING

The purpose of the course is to teach certain conventional methods of planning, detailing and estimating a simple frame house in a practical, draughtsmanlike manner. The material presented is suitable for adaptation to the use of high school or vocational classes.

1. Lettering
   Proportion and style in lettering and conventional uses in architectural work.
2. Sill details.
   Box and solid timber sills.
3. Cornice details.
   Open and box cornices.
4. Floor, wall and roof framing.
   Openings, partitions and rafter details.
5. Window details.
   Basement and barn sash frames.
   Sash and frame for a check rail window with pockets and pulleys.
6. Door details.
   Inside door and frame with planted stop; rabbeted plank frame for outside door.
7. Roofs.
   Shed, pitch, hip, gambrel, mansard, and combinations.
8. Porch details.
   Floor and roof framing, railing, posts, cornice.
9. Stair details.
   Carriages, treads, risers, skirting boards, housed stringers, saddle boards, mouldings, balusters, railing, stair posts, forms of flights.
10. Fireplace, chimney, and masonry details.
    Openings and flues in fireplace and chimney, construction of basement walls.
11. Cottage plans.
    Floor plans, elevations, details, specifications and estimates.
12. Two story house plans.
    Floor plans, elevations, details, specifications and estimates.

The information necessary for doing the above work is given through lectures and blackboard talks with references to working plans, books of details, trade magazines, and commercial stock and design books. Each student keeps a note book of sketches and notes on designing, constructing, estimating, specification writing, and professional work.

MANUAL TRAINING DESIGN

Lectures are given upon the principles of design and requirements for shop training. Practice is given in the use of the pencil, pen and ink, and wash for design purposes.

1. Pencil technique.
   Free hand drawing and design as a basis for the application of design to shop constructions. An attempt is made here to develop good pencil technique and ability to work effectively.
2. Applied Design.
   The application of design to pottery and tile making; to cement work; to weaving and basketry and paper and cardboard work; to bench woodwork; to wood turning and cabinet making; to sheet metal work, forging, and foundry work.
3. Study of Construction.
   Consideration is given to the constructive requirements of different materials, and the suitability of design to different types of construction is shown.
4. Outlines and fastenings.
   Through a study of typical pieces of construction peculiarly appropriate to their intended use, students are shown methods of adapting design to requirements of use of finished constructions. By means of a study of general shapes of constructions and the modification of small details, it is seen how the fundamental lines of a design may be refined. By considering the leading lines and fastenings of construction as decorative features, one method of emphasizing details of construction is seen. Designs are made for various shops.

FREEHAND DRAWING

A sketch class for teachers of shop work gives special attention to the making of free hand drawings in pencil of shop projects and details of shop equipment. Practice is given also in the making of blackboard sketches, and the use of pen and ink for illustrations of the making of school products. This course is planned especially for shop teachers' use in making ideas clear to pupils.

1. Pencil practice.
   Pencil practice begins with the study of lines and tones in pencil, and the use of the different qualities of pencil. This is followed by a representation of different materials in pencil with a study of surface textures.
2. Perspective Sketching.
   Objects are sketched in outline in perspective, and include: furniture and interiors, student constructions from the manual training shops, and illustrations of students at work at various occupations.
3. Sketching in light and shade.
   Sketching in light and shade covers in pencil the same general line of work as that which is done in outline. This is followed by black board sketching and a rapid use of the soft pencil for the making of explanatory sketches.

ELEMENTARY WOODWORK

Elementary woodwork includes such tool processes and construction work as may be given to public school classes in the fifth, sixth and seventh grades. A course of models and exercises suitable for these grades is outlined below.

Name plate,— use of plane, try square, and rule.
Key label,—use of brace and bit.
Plant label,— laying out, chiseling slant cuts.
Cord winder,—use of saw, more difficult chiseling.
Shipping tag,—use of compass, chiseling and sandpapering rounded end.
Match scratcher,— putting on sand paper.
Pencil sharpener,— more difficult laying out and chiseling.
Fish line winder,—cutting ends with saw and chisel.
Water wheel,—making half lap joint, assembling, and nailing.
Bird house,—squaring several pieces of stock to size and assembling.
Bill file,— squaring up rough stock to three dimensions, chamfering, boring.
Bread board,—laying out rounded corners and edges, use of chisel and file.
Game board,— laying out octagon, chamfering.
Coat hanger,—laying out curve to measurements, use of spoke shave.

Bracket shelf,—designing, use of coping saw.
Pencil box,—cutting grooves, fitting cover.
Glove box,—staining and waxing.

In connection with the working out of these problems the students make a thorough study of methods of teaching, courses of study, and equipments necessary or desirable. Students also begin to solve some of the problems of teaching by preparing and presenting lessons or demonstrating tool processes as they would be given to a public school class.

UPPER GRADE WOODWORK

Upper grade woodwork continues the same lines of study and effort as are suggested in the elementary woodwork course. The problems worked out here are such as can be given in the eighth grade or first year high school. The first part of the course consists of making several small models, the designs and dimensions of which are given out by the instructor. During the latter part of the course the students are required to design two or more problems and then to execute these.

A typical course is outlined below:

Whisk broom holder,—laying out, boring, sawing, chiseling.
Hat rack,—chamfering, designing pegs.
Hammer handle,—laying out, use of spoke shave and sandpaper, oiling.
Hatchet handle,—laying out curved form.
Glove box, cutting rabbet joint, sawing apart, hinging, staining, and shellacking.
Pen tray,—gouging, polishing.
Pen and ink stand,—designing shape.
Letter box,—squaring to exact dimensions, assembling.
Foot stool,—upholstering.
Wall cabinet, or other piece of furniture,—grooving, paneling, mortising and tenoning, fitting and hanging door; staining and shellacking.

Basswood, pine, butternut, oak, maple, birch, and gum are some of the woods used. The staining and finishing of these woods occupies a portion of the time. Saw filing is also taken up.

JOINERY

The course in joinery aims to give the student through practice, a good knowledge of the use of the common bench tools and to familiarize him with the different parts of each tool and its proper care. The different woods and materials which are used in the course are discussed, and demonstrations are given in the making of joints. An attempt is made to present work which will lead up to the trades of carpentry, cabinet making and pattern-making.

1. Lap Joint.
   Planing working face and edge; familiarity with the different parts of the plane; proper method of using plane; position of body and arms when planing; squareing up stock; familiarity with the try square and its parts; laying out; use of the knife, try square and rule; gauging; the marking gauge and its parts; proper method of using it; sawing to lines; use of the cross cut saw in working to a line; chiseling; the chisel and its parts; chiseling to a line; fitting of joint.
2. Nail Box.
   Laying out of duplicate parts on sawed out pieces of stock for a box construction, making of dado and lap joints, fitting sides and nailing, fitting in bottom and nailing.
3. Mortise and Tenon Joint.
   Squaring up stock, laying out, sawing and chiseling, fitting joint.

4. Double Dovetail Joint.
   Laying out dovetails, sawing to lines, chiseling and fitting.
5. Mitre box.
   Ripping out rough stock, the rip saw and its use, planing stock to dimensions given, screwing together, the use of screws and methods of driving them, laying off mitres on box and sawing to lines, finishing ends and smoothing entire box.
6. Saw Points.
   This exercise is given to familiarize the student with the different kinds of saws by cutting from thin strips of wood the teeth of a cross cut and rip saw.
7. Drawing Board.
   Ripping from rough boards the stock needed, jointing edges for gluing, gluing up, rabbeting ends for rails, squaring up the surfacing, finishing with sand paper. Talks on materials used such as glue, clamps, and planes.

A number of supplementary joints are given in this course and among them are the slip mitre, half lap dove tail, half blind dove tail, a splice joint and several others which involve accurate laying out and cutting to lines. As much work is given as the student is capable of handling.

WOOD TURNING

Wood turning is given for second year high school classes although it may be introduced into the first year if there is a desire to push the work down from the upper years. The course covers exercises planned to give a familiarity with both turners' and pattern makers' work and introduces power machinery. Attention is given to correct position of the body, manner of holding the tools, correct use of tools, methods of sharpening, dangers to avoid.

A series of exercise pieces is made in soft wood, bringing in the turning of cylinders, cones, stepping cylinders, V grooves, circular grooves, beads and reverse curves, turned between centers. This is followed by face plate and chuck work and a fitting exercise. Hardwood applications of turning exercises include tool handles, mallets, ring, ball, and pieces designed by the student. Work in preparation for pattern making includes the making of several pieces between centers and on the face plate by scraping, and a few simple turned patterns. Students are required to take proper care of lathes and tools, and to observe the application of those principles necessary for the successful teaching of wood turning. Good qualities to look for in a lathe are pointed out.

WOOD FINISHING

Two courses are offered in wood finishing, one for beginners and one for students who have had the elementary work. They cover the making of a series of panels of different woods, $\frac{3}{4}$"x6"x18". The surfaces being planed, scraped, sand papered, stained, filled, and polished, showing the method and value of different types of finish as pieces of regular sequenced work. In addition to this, students are given practical work in painting, interior finishing, and the finishing of furniture. The scope of the course is as follows:

1. Pine Panel.
   One face oiled two coats; the other face rubbed and varnished with one coat of shellac and two coats varnish rubbed with pumice stone and oil.
2. Oak Panel.
   One face stained, shellacked and waxed; the other face filled, shellacked, varnished with three coats, and rubbed.
3. Oak Panel.
   One face natural finish, filled, shellacked, and varnished three coats; the other face divided to show the steps in the varnish finish.

4. Birch Panel.
   One face of natural finish, shellacked and varnished with two coats; the other face stained, shellacked, given four coats of varnish and hand polished.
5. Gumwood Panel.
   One face given a white enameled finish; the other face showing the steps in making the white enamel finish; including primer, two coats of flat white, one coat white enamel, rubbed with pumice and water.
6. Oak Panel.
   Both faces original in methods of treatment.
7. Fumed Panel.
   Both faces fumed; one face moistened with tannic acid, shellacked and waxed.
8. Other Panels.
   Varied to suit the time, interest, and ability of the class.
9. Practical Work.
   Painting school-room walls, cottages built by students, and pieces of equipment; finishing various jobs about the school.
10. Lectures.
    Preparation of the wood; planing, scraping, and sanding; stains and staining; production and use of different stains; formulas for making water and spirit stains; fuming; fillers and their composition and use, methods of filling hard and soft woods; open and close grained woods; wax, and its character and preparation, different uses; rubbing with sand paper, with pumice stone, with rotten stone; polishing, use of curled hair, use of steel wool; selection and care of materials; commercial practice in wood finishing; suggestions for handling wood finishing in school shops.

ELEMENTARY PATTERN MAKING

In choosing a course of projects for a pattern making course in Manual Training Schools there are several things which seem to be quite essential. These are: (a) To choose patterns which are typical as near as possible to the work in the district. (b) To choose patterns which are not too large but will bring out several definite ideas which govern pattern making and molding. (c) To arrange these projects in sequence so that one will naturally lead up to the next, thus saving time by not covering the same ground twice, which might be done if the selection had not been wise.

If these things are carried out and the course is properly taught the pupil will learn the fundamental laws governing pattern making quite easily. These go a long way towards making a successful pattern maker, although of course there are shop kinks and short cuts which the student cannot get in the short time he is in his classes, for the opportunities may not arise for learning and using them.

1. Pattern for a Planer Block.
   To teach the principles of pattern making such as selecting stock, laying out a small pattern on a solid piece of wood, the need of accuracy in measurements, allowance for shrinkage and draft, sand papering and shellacking.
2. Pattern for Angle Iron.
   The laying out and constructing of a small pattern from several pieces of wood, use of leather and other fillets and methods of placing them, the several methods of molding such a pattern.
3. Pattern for Gibbed Way.
   Different methods of molding such a pattern, the use of loose pieces to facilitate the operation of molding; method of construction and fastening loose pieces to a pattern.
4. Pattern for Jig Plate.
   Construction of a built up pattern using center lines; use of core prints in making cored holes, allowance for finish for machining in machine shop.

5. Core Box for Jig Plate.
   Use of cores, core prints and core boxes; different methods of constructing small core boxes and the advantages derived from each.
6. Pattern for Brass Bushing.
   Methods of preparing stock for split patterns and the use of screws, dogs, glue, to hold parts together while being turned; pattern turning and the use and care of the lathe and tools.
7. Core Box for Brass Bushing.
   Construction of a half core box; use of core box plane.
8. Patterns for Pipe Tee.
   Making working sketches from casting and making pattern from them; method of constructing a split pattern built up of turned pieces; fitting, gluing and nailing.
9. Core Box for Pipe Tee.
   Laying out irregular core box on solid piece and gouging out; the use of the different tools used.
10. Pattern for Return Bend.
    To teach further the making of working sketches from castings, the construction of split pattern using parts turned on chuck and spindle of lathe, the use of the template, and the balance core prints and cores.
11. Core Boxes for Return Bend.
    Method of turning parts of core box on lathe chuck, building up core box with other parts gouged out.
12. Pattern for Arm of Eccentric Wheel.
    Method of laying out and sawing a small irregular pattern, the use of the knife in whittling patterns, training the eye in getting good curves.
13. Pattern for Gear Blank.
    Making small turned pattern on lathe chuck, re-chucking pattern to finish off reverse face, marking centers for holes in web, boring holes and sandpapering draft, using spindle sand paper roll.
14. Hand Wheel Pattern.
    Method of gluing up a small pattern in segments, use of chuck and methods of fastening segments, ways of making and laying out arms for hand wheel, gluing in position with bosses in place, turning up whole pattern after it is glued, finishing arms and rim after turning.

CABINET MAKING

An eighteen weeks course covers the principles, methods and actual practice of cabinet construction, with a combination of joinery exercises that are to be made with the use of power machinery. In the building of this cabinet commercial methods are followed as nearly as possible, considering them in connection with instructions that are necessary for the student. Following explanations and demonstrations, which are given step by step, each student does every part involved in the building of his own cabinet throughout from beginning to end, according to the following outline.

1. Working Drawing.
   At the beginning, the working drawing and details of joints and construction, tends to acquaint the beginner with the work that is to be done and aids him in forming a picture of the finished cabinet in his mind as a mechanic would see it.
2. Mill Bill.
   The mill bill indicates the name, number, sizes, kinds of material and operations in milling. The figuring and taking off of the mill bill not only tends to further acquaint the student with the parts but acts as a guide in the cutting and milling of material.
3. Milling.
   The milling of the parts or pieces according to the mill bill consists in the practice of economic cutting of lumber by the use of power machinery, such as surfacing or

dressing, jointing and ripping stock to straight, square and paralell edges, cutting off to length, and resawing, required for preparing stock for the next step.

4. Face Marking.
   Why and how face marking should be done for the purposes that require them.

5. Pairing Up and Laying Out.
   By this is meant the decision, according to face marks, as to the position of each piece involved and its relation to other parts, also the laying out for mortises, tennons, relishes, and grooves for panels, which is to serve in connection with the above mentioned face marking and pairing. The face marking and laying out is done at one time for all the pieces involved in the cabinet and if systematically done will not only indicate where mortising and tenoning is to be done but how each piece is to go into the different machines without having to again stop to consider the position of the piece in the cabinet and its relation to other parts. It also acts as a guide for checking exact size for panels and for inside and outside dimensions of frame work, before stock goes to the machines and is a guide again in the assembling.

6. Machining Stock.
   The different parts of machining, done according to shop methods, requires the setting up and running of power mortiser, tenoner, groovers and the relishing, rabbeting, beveling, the tapering of legs, and the raising and beveling of panels, also the four different ways of fitting panels in the cabinet.

7. Bench Work.
   Smoothing consists in the removing of mill marks and other indentations by the use of planes, scrapers, and sand-papering, as the case may require.

8. Gluing and Clamping.
   This covers the use of boiled and prepared glue, the preparation and boiling of glue and applying both kinds, and the proper application of clamps.

9. Assembling.
   The partition and bottom of cabinet having to be notched into corner posts and snugly fitted to walls to hold them in place without any other fastening, gives extended practice in the smoothing and fitting together of sections and the fitting and gluing of joints in top, which is to be fastened to cabinet to allow for expansion and contraction. In connection with the assembling of the cabinet follows the making of dove-tail joints for the drawer and the fitting of drawer and door to cabinet, fitting of hinges and catch for the hanging of the door and lastly the cleaning up and sandpapering to prepare the cabinet for finish.

10. Finishing.
    The finishing consists of the staining, filling, shellacking and varnishing with a rubbed dull finish.

CARPENTRY

The course in carpentry is of a decidedly practical character and is intended to fit the individual for vocational or trade teaching as well as for elementary public school teaching. The work done is on actual cottage and house coustruction, the working conditions are similar to those found in the trade, while the division of labor and instruction given are based on the best teaching practice.

1. Framing.
   Sills, girders and posts, floors joists, bridging, diagonal floor lining, corner posts, outside walls, bearing partitions, openings in floors and walls, ledger board, second floor joists, sheating, common, hip and valley, and jack rafters, stair platforms, rough stair stringers, porch framing, scaffolding.

2. Outside Finish.
   Open timber cornice, box cornice, gable finish, shingles, door and window frames, window sash, water table, corner boards, siding, porch finish.

3. Inside Finish.
   Wall finish, flooring, door jambs, door and window casings, doors, dadoes, moldings, built in fittings, hardware, face stringers, stair posts, treads and risers, handrailing.

Theoretical work includes: — Use of carpenter's steel square to solve geometrical problems, to lay out members of construction such as stair strings and rafters; reading plans, making details and layouts from plans; grading lumber, figuring quantities and costs; inspection trips; note book, text book, and professional work.

MILL WORK

An eighteen weeks course for the purpose of acquainting students with the precautions necessary around mill machinery on account of the speed at which they are required to run, instruction in the care of machinery and belting, the use of practical mill terms for different operations and parts of construction, setting up and running of machines.

It is not recommended that grade or even the first years of high school classes should in manual training take up the actual work on power machinery, but the course is offered to cover conditions where teachers are expected to be entrusted with the care and working of the machines.

1. Selection of Machinery.
   Approximate prices of machines, factors in purchasing mill equipment.

2. Care of Machinery.
   Care of planers, jointers, rip and cut off saw benches, band and resaws, mortisers, tenoners, shaper, grinders, the attachments to all the above, such as the sharpening of planer, jointer, tenoner and shaper knives; gumming, swaging or setting and filing of circular, band, and resaws, mortiser chisels; oiling and adjusting of bearings, lining up, babbitting, scraping, fitting and adjusting of new bearings.

3. Setting Up and Running.
   Setting the edge tools, and feeds of the different machines for such as the requirements from time to time demand, testing to see if required results are obtained, methods of precaution against accidents in working around machines when they are running, methods of running stock with regards to the best results in machining, results of improper methods.

4. Speeds.
   Figuring speeds of line-shafts, counter shafts, speed of driver and driven pullies, cutting speeds of machines and horse power required.

5. Belting.
   Care, horsepower, and kinds of belting, prices and comparison of different kinds, different kinds and ways of lacing, proper tension and ways of running belts.

6. Knives.
   Laying out by geometric projection and intersection or otherwise, grinding of shapes required for moulding knives to make a certain moulding and the tempering of knives.

7. Stock.
   Cutting stock for other classes and all millwork projects by the use of power machinery. The sequence of operations for the best results considering the work in hand, materials to be used, the economy of materials and time, as to cutting a given number of pieces with sizes given, without wasting a lot of small pieces of material that would go to the furnace, or without making a lot of pieces that would go back in rack and cause an accumulation of pieces that would exceed the demand, not work in for anything but be in the way and finally go to the furnace with the shavings and scraps.

8. Frames.
   The terms applied to different parts of window and door frames, the operations in making, figuring sizes and prices of frames and parts; what governs sizes of frames and their parts, basement frames, brick, brick veneer and ordinary frame constructed house frames.

Making mill bill figuring and milling, setting up and maching stock, and such bench work as the assembling or setting up of frames.

9. Sash, Windows, Screens, and Doors.
   Terms of parts and members, prices, construction, making mill bill, milling, setting up of machines and machining different parts of stock and such bench work as assembling and smoothing.

10. Built In Cabinets.
    Planning, sketching and drawing of the modern built in cabinets for various purposes, figuring mill bill; the things required to be done as outlined for frames, sash, and doors, except as they differ for the difference of shape and size.

11. Interior Finish and Stair Case Work.
    Also covered in a similar manner.

ELEMENTARY FORGING

Before any practical work is attempted the student masters certain preliminary matters such as building and care of fire, position at anvil and forge, proper handling of tools, care of equipment and room. The problems offered in elementary forging are as follows:

1. Drawing Exercises.
   Building and care of fire, handling of tools, position at anvil, the manipulation of iron, methods of drawing, (1) round stock to square, and (2) square to round.

2. Bent Ring.
   Calculation of stock, upsetting ends, bending to circle.

3. Hammock Hook.
   Bending eye, forming, drawing, bending.

4. Staple.
   Drawing, bending.

5. Gate Hook.
   Drawing round stock to square, square stock to round, bending, and twisting.

6. Eye Bolt.
   This is a supplementary problem, and involves the following tool proceesses; drawing square stock to flat, bending eye, drawing square stock to round, thread cutting, as well as calculation of stock necessary in forming eye.

7. Square Head Bolt.
   Upsetting, forming.

8. Hexagon Head Bolt.
   Supplementary, upsetting, forming.

9. Welding Exercise, Fagot Weld.
   Introduction to process of welding, building and keeping of fire, welding heat, effect of light and heavy blows.

10. Ring.
    Simple scarf weld, and upsetting.

11. Welded Hook.
    Supplementary, bending, welding and shaping.

12. Flat Washer.
    Supplementary, calculation of flat stock, bending of stock, upsetting, welding, shaping.

13. Chain.
    Eight links, bending, welding, shaping, assembling of links.

14. Hook.
    Upsetting, fullering, drawing, punching, forming, bending. This is connected to the chain links, problem 13.

15. Eye Bolt and Ring;
    Bending, welding and assembing of pieces.

16. Clevis Pin.
    Supplementary problem, using additional stock by welding collar, fullering, forming, punching.

17. Coat Hook.
    Introduction of design in regard to form. Shaping, splitting, welding, drawing, drilling.

18. Flat Jaw Tongs.
    Shaping, welding of soft steel and iron, drilling, riveting, assembling.

In all the above problems there is a definite relation existing between each problem. Each one depends upon the one before for certain information, and at the same time offers certain new information to the student. The supplementary problems are merely additional problems for students who work faster than the class. The acquiring of skill in the manipulation of iron and steel and the handling of tools is necessary but the ability to teach others the same things is equally as important to the manual training teacher. Time is given to the development of methods of teaching forging, planning of courses, the relationship of problems in regard to tool processes and applications. From time to time students give sample demonstrations of problems and give reports upon the text used, upon reference readings, and upon current topics of interest to the metal worker. Study is also made of the selection, care and maintenance of equipment. Note books are kept in connection with the work and cover the complete course. Each problem is taken up under the following heads: (1) Sketch or complete drawing, (2) Amount and kind of material, (3) Tool processes, (4) Steps in construction, (5) Remarks.

ADVANCED FORGING

The advance forging consists of two parts: (1) tool smithing and (2) art smithing. Each course is nine weeks in length.

The problems offered in tool smithing are:

1. Simple bench tools.
   Cold chisel, center punch, chipping chisel, counter sink bit, counter bore, screw driver.

2. Lathe tools.
   Side boring tool, side tool, cut off tool, thread tool, round nose tool, diamond point.

3. Simple forge tools.
   Set hammer, hot cutter, cold cutter, hardie, handle punch.

4. Hammers.
   Straight pene and round pene.

The problems in art smithing are more of the students own choosing under the direction of the teacher.

Drawer pulls, fire sets, andirons, lamps and lanterns are typical problems of this course.

Note books are required in each of these courses and cover (1) complete drawing, kind and size of stock, (2) steps in construction and (3) general remarks in regard to place in course or steps in construction.

In connection with the tool smithing a text is used and the student is expected to be familiar with the heat treatment of steel, its various compositions and uses, as well as methods of production.

ELEMENTARY MACHINE WORK

A course of exercises embodies the fundamental operations on each machine. The following arrangement is the sequence followed when conditions are possible. Where it is convenient, exercises finished in an earlier part of the course are used again, thus saving a great deal of routine work.

1. Cylindrical turning.
   Stock soft steel—location of centers, testing, drilling, tool setting.
2. Cylindrical turning,
   Stock soft steel plain turning to a definite size, closer limit than required in No. 1, turning roughly to a shoulder.
3. Cylindrical turning.
   Stock, exercise No 1—accurate location of shoulders, making a fillet, end facing between centers.
4. Cylindrical turning.
   Stock bolt forging—turning, facing, squaring up a shoulder.
5. Cylindrical turning.
   Stock, machinery steel—turning, using coarse feeds and deep cuts, accuracy, speed.
6. Cylindrical turning.
   Stock, casting of eccentric—turning cast iron, squaring to a shoulder, location of centers by use of "V" blocks and surface gauge, cutting speeds, condition necessary to obtain a smooth surface.
7. Taper turning.
   Stock, exercise No. 3—calculation of taper, methods of turning taper, fitting taper, file finish, and polishing with emery cloth.
8. Screw cutting.
   Stock, exercise No. 2—calculating change gears, cutting right hand and left hand threads.
9. Screw cutting.
   Stock, excercise No. 4—right hand thread, fitting a thread to gauge, conditions necessary to get an accurate thread of correct shape and perfect tool finish.
10. Screw cutting.
    Stock, exercise No. 5—speed in cutting, closer limits of accuracy and finish than in exercise No. 9.
11. Chucking and Boring.
    Stock Cast iron ring—use of clutch to hold work, use of boring tool, use of limit gauges, exercise is reversed and finished in chuck and must have the two cuts exactly coincident.
12. Internal threading.
    Stock, hexagon nut casting—accurate chucking, boring, and internal threading, use of thread gauge.
13. Milling.
    Stock, exercise No. 12—use of milling machine to produce flat surfaces, indexing.
14. Milling.
    Stock, exercise No. 1—gear cutting, shape of teeth, indexing.
15. Milling machine bolts.
    Stock, exercise No. 10—milling square, direct indexing, use of end mill. Piece is cut in two at the lathe in a chuck, with the use of a parting tool.
16. Milling head of bolt.
    Stock, exercise No. 9—more practice in No. 15 to prepare more fully for No 17.
17. Spur center.
    Stock, exercise No. 7—setting up machine for a particular operation, accurate measurements by use of graduated lead screws. If student has made an extra center, he finishes one for a cup center.
18. Shaper exercise.
    Stock, cast iron—use of shaper tools, planing up a rectangular block, leaving smooth surfaces and all faces square with one another.

19. Bench exercise.
    Stock, steel block—chipping and filing, use of common bench tools.
20. Drill press exercises.
    Stock, Exercise 18—holes are accurately laid out from blue print, drilling, use of gauge to draw a drill to center, use of drill circles, must come within limits fixed by limit gauge.
21. Common hand finishes.
    Stock, exercise No 20—Surfaces are filed and polished and given representative finish common to the machine trade, as clouding, spotting, and scraping.

ADVANCED MACHINE WORK

A course of work is offered to enable the student to apply the principles learned in the preliminary work, to the solution of larger and more difficult problems.

1. Lathe Work.
   Standard arbor. (Stock—tool steel) Careful centering of stock; accurately forming center holes; cylindrical turning; tools and methods of handling tool steel.
   Reamer. (Stock—tool steel) Cylindrical turning; working to very close limits; study of kinds of reamers and uses.
   Tap. (Stock—tool steel) Cylindrical turning; polishing; threading to perfect shape, finish and accurate dimensions.
   Milling cutter. (Stock—tool steel) Cylindrical turning; chucking; facing; centering; drilling; boring; recessing; turning on arbor.
   Jig bushings. (Stock—tool steel) Chucking; facing; centering; drilling; boring; turning on arbor.
   Plug gauge. (Stock—tool steel) Centering; turning; polishing; nurling.
   Gear blank. (Stock—cast iron) Chucking; facing; centering; drilling; boring; reaming; turning on arbor to very close limits; calculation for gearing: study of systems of gearing.
2. Shaper Work,
   Jig body on shaper. (Stock—cast iron) Laying out of work; setting of work; use of different tools and working to close limits.
   Key way. (Stock—gear blank) Setting of tools and use of gauge.
3. Planer Work.
   Planer is used upon such large work as happens to be in progress.
4. Drilling.
   (Stock—jig casting) Drilling of holes for the necessary screws and bushings; accurate laying out; correct location of hole in reference to lay out.
5. Milling Machine Work.
   Exercise 1. (Stock—standard arbor) Milling spots on ends of arbor to clamp the dog screws upon when in use; use of plain circular cutter.
   Exercise 2. (Stock—gear blank) Cutting of gear teeth; setting of machine; selection of cutter for shape of teeth; indexing; calculation of settings; use of graduated lead screws.
   Exercise 3. (Stock—reamers) Studying shape of flutes and angles of clearance; indexing to get irregular spacing.
   Exercise 4. (Stock—tap) Milling square for wrench, milling flutes.
   Exercise 5. (Stock—milling cutter) Spiral milling; use of charge gears; setting of cutters for shape of tooth.
   Exercise 6. (Stock—jig casting) Bushing holes finished accurately to size with boring tool, location of holes by use of lead screws of machine.
6. Finish Grinding.
   All steel work such as tools are finished after hardening upon the universal grinder.
   Exercise 1. (Stock—arbor) Use of grinder for finishing of cylindrical surfaces; use of micrometers; use of micrometer stop on machine.
   Exercise 2. (Stock—reamer) Cylindrical grinding to close limits.

Exercise 3. (Stock—milling cutter) Internal grinding; facing; finishing on arbor between centers.
Exercise 4. (Stock—jig bushings) Internal grinding on arbor between centers; grinding on arbor between centers; grinding up to a shoulder.
Exercise 5. (Stock—plug gauge) Cylindrical grinding to limit of .0001"; finishing by lapping.
Exercise 6. (Stock—milling cutter and reamer) Relieving cutting edges; giving proper angles of rake and clearance.

7. Assembly and repair work.
   Machinery needed for further equipping the school is sometimes built. So far as is practical the repairing needed in the various departments is done in the school shops.
8. Bench Work.
   A large amount of bench work is required to enable the student to do any one of the above exercises, especially in assembly and repair, so no definite exercises in bench work are done.
9. Professional Work
   A large amount of reading is required, also papers are called for which deal with the work in hand, giving in each case a lesson plan and all the demonstration talks necessary to present the exercise to a class. Examinations are given to test the accuracy of the student's organization of the subject matter. A text is used and also from time to time articles in the current trade papers are assigned for reading and discussion.

FOUNDRY PRACTICE

The idea of this course is to give the student as much practical work as possible in molding, managing the cupola and brass and aluminum founding. Founding is an art which requires considerable experience before successful castings can be made and in this course the student is given work with a number of patterns illustrating different ways of molding before the actual pouring takes place. Talks and demonstrations are given at different times during the course on the materials used and different methods of molding certain patterns.

1. Bench and Floor Molding.
   Bench Molding. Exercises in molding small patterns in two part flask involving the use of the ordinary molders' tools and methods, practice in proper ramming, venting, gating, and coping down; molding split patterns and patterns with cores, use of two and three part flasks.
   Floor Molding. Exercises in molding larger patterns and the use of floor rammers, clamps, wedges, pinchbars and methods of rolling over and setting larger cores.
2. Core making.
   The uses of cores, different kinds and methods of making. A study of core sands, binders, mixtures, core machines and baking ovens. Making and baking cores of different shapes and sizes, venting, pasting, blacking, and finishing.
3. Cupola Work.
   Preparation of cupola for a heat by chipping out, daubing, lining, making bottoms and trough, building breast, weighing out and selection of iron and coke for the charges, use of fluxes, lining and drying ladles, laying of fire, placing of bed and successive charges, use of cupola tools in tapping out, stopping up, skimming and pouring.
4. Brass and Aluminum Foundings.
   Talk on the brass furnace, melting and mixing brass and aluminum, fluxes, and the use and care of crucibles, tongs, and materials.

ELEMENTARY BRICKLAYING

Elementary bricklaying is designed to cover the problems of actual construction in a professional manner so as to be of assistance to teachers of

either manual training or vocational schools. Shop talks, shop mathematics, applied design, assigned readings and reports on same, together with discussions, make up in part, the work of the course. The outline is in terms of projects made and comprises:

1. 4" Wall with Returns. Spreading mortar, laying brick, making proper bond, plumbing courses, testing of joints.
2. 8½" American Bond Wall, with return and intersecting wall.
3. 13" American Bond Wall, with return and intersecting wall.
4. 8½" Running Bond Wall, diagonal bond tying.
5. 8½" Running Bond Wall, strap-iron tying.
6. 8½" Flemish Bond Wall, with return.
7. 8½" Flemish Cross Bond Wall, with return.
8. 8½" Double Flemish Cross Bond Wall, with return.
9. 8½" English Bond Wall.
10. 8½" Dutch Bond Wall.
11. 8½" American Bond Wall containing door and window frames.
12. Formation of single and double flues as started in basement walls.
13. Formation of single and double flues as started in first story walls.
14. Formation of single flue as started in corner of first story walls.
15. Formation of double flue as started in corner of first story walls.
16. 13"x17" flue having plain top.
17. 17"x17" flue having crown top,
18. 21"x21" flue having beehive top.
19. 17"x21" flue having panel top.

ADVANCED BRICKLAYING

This phase of the work covers the more advanced details of construction which go to make up the complete structure, as:

Octagonal bay containing window frame.
10" and 14" Hollow Walls.
Brick veneering on frame construction.
Segmental, semi-circular, elliptical, bishop's cap, Tudor, increasing, Moorish, combination flat and segmental flat or Jack, inverted, bull's eye, intersecting, and groined arches.
Cornices showing dentiled effect and geometrical design.
Ornamental pilasters.
Fireplace designing and construction.

After the essential details are made, a number of orginal designs may be built involving a combination of suitable details in building construction.

CEMENT WORK

Aims of this course are to teach the fundamental principles involved in concrete construction, to make a set of projects involving the knowledge of a variety of ways of making and finishing concrete, to develop skill and accuracy in the handling of materials, to teach the use and proper care of the necessary tools about the work, and to show the methods of presenting the subject to others. The course is especially adapted for work in agricultural schools.

1. Section of sidewalk, giving special attention to crowning of surface.
2. Section of curb, use of forms, finishing of corners.
3. Section of gutter.
4. Section of floor with drains.
5. Foundation walls, a study of different mixtures, and method of handling.
6. Retaining wall.
7. Dam breast.
8. Fence posts.
9. Hitching posts.
10. Clothes posts.
11. Hollow construction blocks.
12. Keystones as used in each construction.

Some of the more advanced work comprises problems in reinforced construction, as—columns, beams, slabs, steps, silos, tanks, and driveways. Some special work in stucco, mason floors and hearths, and elementary tree surgery is attempted if time permits.

PLUMBING

Teachers of manual training are given an acquaintance with the plumbers' problems in order that a better idea may be had of general industrial conditions and better provision made to meet these conditions in manual training courses. The work is largely practical shop work supplemented by lectures covering plumbing, heating, and gas fitting. The school is well equipped for practical instruction and constant additions are being made to keep equipment up to date. The first part of the course is covered in the elementary course during the Junior year.

1. Iron Pipe.
   Cutting and threading of iron pipe, using different types of cutters, stocks and dies of solid and adjustable pattern, followed by use of taps and reamer.
   Cutting and fitting according to plan and measurement with the more common fittings is followed by exercises illustrating the use of the union, right and left coupling, and the running thread and lock nut, as methods of connecting lines of pipe.
2. Soil Pipe and Fittings.
   Used in house drainage work for soil, waste and vent stacks with the proper fittings. The making of caulked joints as used by plumbers and the cutting, fitting and joining of stacks and branches into lines of soil pipe with vertical and horizontal joints.
3. Soldering.
   The use and care of the soldering iron and advantage of different shapes for certain work. Straight and angle seams are followed by the lining of sinks and tanks. Pipe soldering includes the making of cup, overcast, and blind joints. The heats of the iron, tinning, and best solders are points thoroughly covered and made plain.
4. Joint Wiping.
   The ability to properly wipe a joint is still essential to the proficient plumber. The preparation of the joint, the proper heat of the metal for wiping, the making and correct sizes of wiping cloths are essential to good work and are taken up in detail. Setting up the joint under varying conditions and the care of solder are basic to the successful finishing of the joint.
5. Erection.
   Setting up plumbing fixtures singly and in groups bring to completion the details that have preceded involving some of the details of each. The house range boiler with its one or more sources of heat, the making of iron pipe frames for sinks to which are piped the water supplies, to the completed house job with kitchen and bath room are features of the final rounding-out process.
6. Theory.
   Lectures cover that part of a complete installation that school shop work may not find

possible. Water from the street main is necessary for the proper working of the plumbing fixtures and at that point the lecture takes up the subject of the water main, its source of supply, the different methods of obtaining the water, also filtration and softening methods. The completed plumbing supplied with water must have sewage disposal and the lectures follow the house sewer to the main sewer in the street and to its outfall where sewage purification is now an important subject before the public. In the same manner the practical work in all parts of the course is supplemented by lectures.

MILLWRIGHTING

This course is intended to enable woodworkers to learn the care and simple repairing necessary to keep their equipment in running condition. Also the problems which are encountered in the installation of equipment are considered. A piece of shafting is installed, pulleys are located and machines are driven from the shaft.

1. Shafting.
   Study of sizes, kinds and methods of locating; leveling and aligning a piece of shafting as an exercise or for a completed job.
2. Hangers.
   Study of types; adjustment and alignment for shafting above (1).
3. Bearings.
   Study of kinds, methods of lubrication, advantages, and disadvantages of different bearings; babbetting and scraping of bearings and cutting of oil grooves for shafting (1).
4. Pulleys.
   Study of kinds, choice; calculations for speeds and alignment for specified requirements.
5. Belting.
   Study of kinds, care, and use; calculating horse power; lacing and putting into use on above job.
6. Motors.
   Study of direct current and alternating current motors, including the theory, characteristics, and selection; repairing and adjusting motors.
7. Wiring.
   Study of power lines, size, factors to be considered, lighting lines, and the use of conduit; actual work connecting motors.
8. Bench Work.
   Chipping, filing, drilling, tapping, threading by use of dies; key way cutting and key fitting.
9. Text and Reference Study.
   References are given and the student is required to prepare papers on the subjects assigned.

PAPER AND CARDBOAD CONSTUCTION

Over half of the teachers of manual trainining are called upon to handle primary handwork in some form and should have some knowledge of the work in order to do it sucessfully. This course gives many suggestions as to methods of teaching children, how best to interest them and get in touch with child nature. The course consists of problems for the first four grades and may be outlined in four groups of problems:

1. Book Problems.
   Folders—for free cutting
   Portfolios—single paper, cloth covered.

Note Book Covers—covered, one and two piece covers.
Paper Files—for pocket and desk use.
Pamphlets—for different uses, kinds of sewing, various ways of folding.
Bound Books—cloth covered, bound magazines, rebinding, repairing old books.

2. Box Problems.
   Open Boxes—corners lapped, reinforced with stay tape.
   Folding Boxes—made from one piece of material.
   Covered Boxes—various materials, fastenings, lining, covering.
   Sliding Boxes—fitting of case and cover.
3. Card Problems.
   Mounts—for pictures and drawings.
   Book Marks—cutting, decorating.
   Post Cards—cutting, ornamenting.
   Shipping Tags—cutting, gluing.
4. Envelope Problems.
   Mailing Envelopes—working from dictation.
   Filing Envelopes—different uses, work from drawings.
   Envelope Files—flat and book.
   Paper Sacks—flat, with folds, commercial sacks.

WEAVING, BASKETRY, BENT IRON, CLAY

This is a companion course with the work of Paper and Cardboard. The problems of the supervisor, courses for the various subjects, suitable equipment, sources of supplies, are all considered so that the student is made to think of the business side of the work, as well as the professional side.

WEAVING

1. Small mat (4"x6")
   Making cardboard loom, stringing warp, weaving, finishing
2. Small rug (6"x9")
   Repairing or making wooden loom, stringing warp, designing border, weaving, weaving border, finishing
3. Rug (9"x12")
   Designing rug, selecting colors, weaving design and border, making fringe
4. Doll's Tam O'Shanter, Stocking Cap, Sweater, or Hammock.
   Students choose one of these problems, make cardboard loom, string warp, weave and complete the problem

BASKETRY

1. Coiled Mat (Strap Stitch)
   Preparing reed, starting center, wrapping reed with raffia, the stitch, finishing
2. Coiled Mat (Knot or Lace Stitch)
   Processes like preceding
3. Coiled Mat (Figure Eight Stitch)
   Processes like those in 1.
4. Coiled Basket (3" in diameter)
   Selecting stitch, starting like mat, shaping basket, design or border, handle.
5. Reed Mat (5" in diameter)
   Splitting spokes, starting center with raffia, weaving with reed, finishing edges.
6. Reed Basket (Not over 4" in diameter)
   Number two spokes not split, starting with raffia, weaving with number one reed, finishing edge.
7. Reed Basket (Not over 5" in diameter)
   Number four spokes not split, starting with number three reed, weaving, finishing edge.

BENT IRON WORK

1. Square Mat
   Making drawing, laying out, cutting iron, shaping, fitting, clinching binders.
2. Candle Stick or Post Card Holder
   Designing, laying out, cutting pieces, bending to pattern, binding.
3. Bridge Truss
   Drawing, making wooden skeleton, cutting pieces, bending, fitting, binding, painting.

CLAY WORK

1. Type Forms and Applications to Solids.
   Cube and Prisms—boxes, books, buildings, familiar objects.
   Sphere and Cylinder—apples, oranges, football, barrel, bottle.
   Cone and Pyramid—bell, tower, grain stack, ink bottle, lighthouse.
2. Reliefs.
   Leaf or flower—cutting away background or placing upon background.
   Cut reliefs of simple geometric design.
3. Poses
   Children—porportion, rough sketching with clay, details.
   Animals—pets or familiar animals, study of form, securing shape, finishing details.
4. Pottery
   Low Dishes—pressing from ball, raising edges.
   Bowls—building by pieces, shaping, smoothing
   Jar and Dishes—rolling coils, forcing coils together, shaping, smoothing, finishing.
   Vase—designing, building by pieces, shaping, smoothing, drying, firing.

SPECIAL SHOP WORK

Special Shop Work consists principally of two lines of work—tinsmithing and home repair work. Both of these lines of work have, been carried on in the public schools and are considered valuable:—first, in giving the boys some acquaintance with and skill in using a variety of tools and materials; second, in giving them work which is closely related to the interests and needs of the home.

The tinsmithing work involves laying out, cutting, bending, soldering, wiring, and riveting. It brings in the use of the soldering furnace, soldering coppers, riveting hammers, snips, wiring machines, and such necessary materials as solder, gasoline, rosin, acids, rivets, and tin.

Some of the work requires the students to apply their knowledge of the development of surfaces as given in the mechanical drawing course.

The home repair work consists of cleaning and refinishing a kitchen chair or other small piece of furniture; caning a chair or canoe seat; filing and fitting a key; rope tying; sharpening knives, skates or axes; and glazing a window.

Most of the time in home repair wook is given to the refinishing of the chair and the work in caning. Only a few lessons are given in the other kinds of work. One of the purposes of the course for normal students is to become acquainted with the several lines of work and to understand the limitations and the possibilities of such work.

ELEMENTARY PRINTING

Students taking this course have an opportunity to become familiar with the processes of printing and are given sufficient practice in the shop to enable them to begin teaching the subject or to supervise it in a school system. After composing a job, the students make it up to the size and

shape required, lock it in a chase for the presses and make it ready on one of them. When it is ready, the stock is run through and printed. The work is arranged so that students move regularly from one kind of work to another, thus securing the most all round experience that is possible in a short time. The problems of printing done in class are given in the following outline:

1. Paragraphs of Straight Composition
   Involving the proper holding of the composing stick, setting it to given lengths, setting the type in place, spacing and justifying lines of type. Copy for these paragraphs varies in nature but as far as possible the work is incorporated with other parts and becomes a finished product.
2. Outlines
   Academic and shop work furnish the copy for this kind of composition. Hanging indentations and setting of longer lines are the new steps.
3. Simple Display Composition (one kind of type)
   Students design and compose small jobs that are used as bulletin notices, explanations of exhibitions or announcements. The work is done with attention to the proper proportion, balance and center of interest of each display card.
4. Display Composition (several kinds of type)
   The general nature of this problem is like that in 3 but is sometimes larger. Students must design and execute the problem so that the use of different kinds of type do not spoil the unity of appearance.
5. Leader Work
   The use of dotted material cast on type bodies is brought out in blanks and forms or records. The student uses the leaders in the simplest ways, setting an entire line of these or combining them at one end of a line with type at the other end.
6. Rule Work
   As illustrated by simple ruled blanks or forms where the rules are used in lines of type to allow blank spaces to be filled by additional words or marks. Students are required to make the face of the rule line with the base line of the type.

ADVANCED PRINTING

Because of the increasing popularity of printing as a subject in the manual arts and vocational work in public schools, students are urged to take the advanced course if possible in order that they may have a better grasp of the work. The processes in the elementary course are continued but with added difficulties and demands for greater accuracy. New processes, such as folding and stapling are introduced. Students are given opportunities for specialization. The problems made in this work are as follows:

1. Booklets
   Composition, correcting in galley, making up pages, correcting pages, imposition of pages, making ready, feeding (with and without slip sheeting), folding, stapling.
2. Posters
   These problems are designed and worked up by students from the rough and incomplete copy. Attention is given to good design and attractive qualities of the display. Athletic posters, announcement of contests, and notice of entertainments given by the students furnish copy that makes this problem very practical.
3. Letter Heads and Envelopes
   Sizes and kinds are considered. Simple and difficult arrangements are carried out. Envelopes are set up to match letter heads. The imposition and press work for envelopes are given.
4. Business Cards
   Different arrangements on same size, different sizes, appearance suited to use, types for this kind of work.

5. Decorative Circulars
   This work is to give students an opportunity to work with borders and ornaments, and to print work with color harmonies.
6. Advertisements
   Type for this work, effective wording as well as attractive display, psychology involved in advertising.
7. Leader Jobs
   Different from those in the elementary course in that words and groups of leaders alternate across a line. Students are required to produce vertical alignment of the words of one line with those of another line.
8. Rule Jobs
   Forming some of the most difficult, yet most interesting problems that occur. Report blanks, ledger records, order blanks and like forms needed in the different departments furnish unlimited copy for this work. Small forms are built up with horizontal and vertical rules properly adjusted. Larger and more difficult forms are built up with horizontal rules and type in one form and vertical material in another form. The special press work for this printing is considered.
9. Tables
   Formulas, estimating, sizes of materials and records of irregular rule work are included in this work. Special care is required to make an accurate form with its many hundreds of pieces of material.

HOME ECONOMICS DEPARTMENT

COURSES OF STUDY FOR 1913-1914

Domestic Science and Domestic Art are terms that are applied to the lines of work here grouped under Home Economics. The term is not satisfactory, but is used because it is more generally understood to include the full range of subjects than either of the others. The scope of the subject matter here outlined covers the following points: Foods and their uses, cookery, general science, sewing. millinery, textiles, drawing and house decoration, emergencies and home nursing, household management, and professional subjects.

FOODS AND COOKERY

Studies in this group deal with nutritive and economic values of foods and the methods of preparing them for use. To this end a knowledge of the requirements of the body, of processes of digestion, of the structure, composition, digestibility, absorption, availability, market appearance, and price are necessary. The system of production of food is considered in so far as it affects the cost and nutritive value of food when it reaches the consumer. Cookery involves the study of the effect of heat variously applied, upon the food principles, of adapting method of cookery to the material in hand to secure the highest return in digestibility and food value with reasonable expenditure of time and labor.

The courses in cookery aim also to develop in each student a high order of technical ability and high standards of order and cleanliness in work. The subject matter is well organized and presented logically, and the practical lessons are presented in sequences according to the orderly development of the subject matter involved, the degree of skill in manipulation required, the availability of food materials and the probable application of the lessons to teaching.

The subjects of the junior year in this group, i. e.; food study and cooking, are prerequsite to the cooking and dietetics of the senior year. Credit in these courses is allowed for courses taken in other schools when those courses prove on examination to be the full equivalent in subject matter and technical work of the courses given here and are planned with similar phases of emphasis, particuarly emphasis on the professional phase.

The professional phases of these courses are presented as an integral part of the work. The sequence of subject matter and practical work, methods of presentation of the subject to classes, ideals, plans and devices in class management are studied with discussion, criticism, and comparison of concrete examples taken from the class work in the institute classes. The modification of a course to meet the needs of different schools, to meet the needs of pupils from various types of home environment, is considered, the many ideas involved to be later summarized and organized in the course on General Organization and Management.

FOOD STUDY

A complete and systematized study of all foods to show composition, structure, nutritive ratio, digestibility, cost, and place in the diet. It includes a study of the chemical and physical changes which take place in foods during cooking and the effect of various temperatures on the digestibility and food value of the various foods. Work in food study is closely correlated with the work in junior cookery so that one complements the other.

The place of Food Study in the public school curriculum, its correlation with other subjects, and the methods of presenting the work in public school classes are discussed.

1. Cell.
   Definition, physical structure, chemical composition, functions, types.
2. Tissues.
   Classification, cell structure.
3. Metabolism.
   Digestion, absorption, circulation, assimilation, excretion.
4. Foods.
   Definition, classification, digestion, absorption, elimination, storage, source and functions of each group. The classification of foods is that used in food chemistry.
5. Vegetable Foods.
   Classed as roots and tubers, cereals, legumes, green vegetables, fruits.
6. Animal Foods.
   Meats, fish, poultry, eggs, milk and its derivatives.

Each food is studied in detail varying with the different ones, but in general covering: kind, cultivation or growth, distribution, preparation for market, transportation, care in the home, market products and prices, chemical composition, digestibility, fuel value, dietetic value, cookery, uses.

ELEMENTARY COOKERY

Elementary cookery is especially designed to meet the needs of those planning to become teachers of domestic science. The student is trained, therefore, not only to obtain good results in housekeeping and cookery, but also to think and work with a view to presenting the subject matter to others. Foods are studied and tested to learn the effect of heat and moisture upon them, and the principles of cookery thus determined are applied in the preparation of simple foods and combinations of food. It is planned to secure a thorough understanding of the theory and method involved in the cooking of the more fundamental foods, rather than to cover the whole field of cookery. Sufficient repetition of processes is given to insure a fair degree of skill in the manipulation of utensils and materials. Attention is given to the systematic organization of the school kitchen and its management. The cost of foods is studied in relation to the income of the home and of the school, and the cost of the lessons is worked out to serve as a basis for comparison. Invalid cookery is given at the end of the course as an application of principles previously given.

1. Simple Carbohydrate Foods.
   Potatoes, cereals, tapioca.
2. Seasonable Vegetables.
   Tomatoes, spinach, root vegetables, egg plant, beans.

3. Preparation and Use of Dried Fruits and Vegetables.
   Peach, pear, apricot, prune, beans, peas.
4. Study of Batters and Doughs.
   Popovers, griddle cakes, muffins, cornbread, biscuits, breads, cakes, plain pastry.
5. Meats and Poultry, Selection and Cookery.
   Beef, veal, mutton, lamb, pork, salt and smoked meats.
6. Fish.
   Fresh, canned, salt.
7. Eggs, Milk, Cheese.
   Combination of eggs, milk and cheese.
8. Puddings.
   Custards and those with custard basis, gelatine, batter.
9. Salads.
   Fruit, vegetables, meat.
10. Beverages.
    Tea, coffee, cocoa.
11. Frozen Desserts.
    Ices, sherbets, creams.
12. Invalid Cookery.
    Gruels, beverages, broths, eggs, breads, laying the tray.
13. Serving Simple Meals in Laboratory as for Grade Work.
    Planning, laying of table, waiting and serving.
14. Canning and Preserving.
    Methods, principles involved, practical work in the simple processes of canning available fruit.

DIETETICS

The purpose of this course is to present the fundamental principles of human nutrition and their application to the feeding of individuals, families, and larger groups under varing physiological, economic, and social conditions. The course aims to relate and apply the principles given in the study of foods and their preparation, physiology, and physiological chemistry. It includes recitation and laboratory work and is designed to be used as a basis for practical work in dietetics as well as for organizing and teaching the subject in the high school.

1. Review of chemistry and physiology of digestion.
2. Metabolism of proteins, fats, carbohydrates.
3. Determination of fuel values of foods.
4. The 100-calorie portion as a unit and the determination of the weight of different foods yielding 100-calories.
5. Modern dietary standards and their practical application.
6. Computations of dietaries fulfilling the energy requirement at definite costs.
7. Preparation of meals in dietaries worked out for special conditions and comparing the theoretical quantities of food with the actual quantity of food consumed.
8. Protein metabolism and protein requirement. Nutritive ratio of foods and dietaries.
9. Mineral metabolism –study of investigations and present theories.
10. Feeding of infants and children, underlying principles and their applications.
11. Diet in diseases with especial reference to disorders of nutrition and metabolism.
12. Planning and cooking of dietaries for especial diseases and estimation of their calorific value.

ADVANCED COOKERY

This course gives practice in several phases of cookery, in selection and marketing of foods, making menus and serving meals. Especial attention is paid to the economic consideration of wise expenditure of time and money

in food preparation. The processes carried out are more elaborate than in the junior year and self-reliance on the part of the student in the plan and execution of her work is encouraged.

The work includes food preservation, food preparation, study of the menu, of table service, individual work in the serving of meals, large quantity cooking and serving, the giving of demonstrations.

1. Food Preservation.
   Canning fruits, making preserves, jelly, pickles, experiments with different methods of canning fruits.
2. Food Preparation.
   Preparation of vegetables, fruits, meats, breads, cakes, pastries, salads, hot desserts, ices. The preparation of these is more elaborate than in the Elementary Cookery. Principles of cooking reviewed and applied independently,— comparison of different methods of work, value of form, computation of cost, including initial cost of material plus value of time and labor involved in preparation.
3. The Menu.
   Planned to meet physiological needs, with reference to availability of foods in the market, cost of food and economy in labor.
4. Marketing.
   Review of system of production as it influences cost of food, time of marketing and selection of food, methods of purchase, co-operation of consumer and retail merchant, basis of selection, methods of accounting.
5. Table Service.
   Forms, standards, controlling factors, cost of service, social values of accepted standards, adaptation of standard forms to existing conditions.
6. Cooking and Serving Meals.
   Application of subject matter above in individual work on typical problems.
7. Large Quantity Cooking and Serving.
   Class work in preparation and serving of banquets for large numbers.
8. Demonstration Cooking.
   The use of cookery to illustrate the lecture on principles and processes of cookery and the subject of foods; discussions, individual exercises.

APPLIED SCIENCE

Science courses here outlined are not designed to give the student a comprehensive knowledge of the subjects studied and are not detailed science courses in the usual sense of the term. Only such phases of the different subjects are dwelt upon as find application in practical home management, and such fundamentals are taught as are necessary to an understanding of these applications. The aim in teaching is not professional but to give a basic understanding of the relation of science to the practical affairs of the home.

PHYSIOLOGY AND HYGIENE

This course is planned for the purpose of teaching (a) the structure and function of the body, organs and tissues, (b) personal hygiene and individual health, (c) public hygiene and general health, (d) physiology and hygiene in relation to the school child.

Conn and Budington's Advanced Physiology is used as a text, supplemented by reference reading. The subject of Sex Physiology and Hygiene is given in a series of lectures by the instructor. Organization and presen-

tation of subject matter and vital present-day school problems of hygiene are discussed.

1. Organs and Tissues.
2. Chemical Composition of the Body.
3. Digestion.
   Mouth, throat, oesophagus, stomach, intestines—foods and food habits, diseases of the intestinal tract.
4. Absorption.
5. Circulation.
   Blood, heart and blood vessels, path of circulation—diseases of the blood.
6. Respiration.
   Nose, pharynx. trachea, lungs, mechanism of respiration and nervous control—diseases of the respiratory organs.
7. Excretion.
   Kidneys, skin—diseases of same.
8. Skeleton Structure.
   Injuries to joints and bones.
9. Muscle.
   Structure, use, exercise.
10. Nervous System—General Anatomy.
    Care of and diseases of nervous system.
11. Special Senses.
    Structure, care.
12. Control of Public Health.
13. Special Physiology.
    a. Physiology and hygiene of female reproductive organs.
    b. Prophylaxis of social diseases.
    c. Sex education.

INORGANIC CHEMISTRY

Inorganic Chemistry deals with such phases of general chemistry as are essential to an understanding of food chemistry rather than to an understanding of general fundamentals. The following are the principle topics considered:

1. Matter.
   Kinds, changes, properties, forms, elements, compounds, mixtures.
2. Chemical reactions.
   Definition, conditions superinducing, characteristics, quantitative aspect, proportions, equations.
3. Water.
   Compositions by volume, by weight; properties—chemical and physical; solution—kinds, states, circumstances affecting, characteristics, application of theory of electrolytic dissociation; purification—boiling, filtration, distillation, chemicals, oxidation, city purification.
4. General outline.—Elements considered as metals and non-metals; compounds composed of metallic and non-metallic oxides; bases—nomenclature, definition, in terms of ion theory formation, reactions; acids—nomenclature, definitions; reactions; salts—nomenclature, definition, formation, reactions.
5. Atomic theory.
   Determination of atomic weights.
   Determination of equivalent, molecular weights, deduction of atomic weights.
6. Valence.
7. Periodic law of the elements.

FOOD CHEMISTRY

Food Chemistry is essential to the understanding of food materials and the reactions which occur in their preparation for use. The course is planned to give this scientific basis for the practical work and to emphasize the essential materials by the analysis of a complete food.

1. Carbon compounds.
   Hydrocarbons, including the oliphatic series of paraffines, olefines, acetylenes, alcohols, ethers, aldehydes, ketones, acids, esters, and the aromatic compounds made up of the benzene series and the derivatives of benzene; fats; carbohydrates—the monosaccharides, hexoses, mannose, dextrose, levulose galactose—the disaccharides, sucrose, lactose, maltose—the polysaccharides, starches, gums, cellulose.
2. Nitrogen compounds.
   Proteins, alkaloids.
3. Mineral compounds.
4. Proximate analysis of milk; ash, moisture, fat, carbohydrate, protein.

PHYSIOLOGICAL CHEMISTRY

Prerequisites to this course are the ones in food chemistry and physiology. The aim is to show the chemical reactions within the body and the results of these reactions.

1. Human body.
   Gross structure; internal structure of respiratory organs, almentary canal, circulatory and lymphatic systems; cell structure, composition, necessary foods; tissues and secretions, blood, various fluids, muscles, nerves, bones, fat.
2. Foods Required in the Body.
   Process of digestion.—Mouth digestion provides mastication, solution of foods, diastatic action, and involves a consideration of the salivary glands, their kinds, location, secretions, and of saliva, its composition, properties, diastatic action, limitations, agents retarding—stomach digestion includes a study of the glands of the mucous membrane, kinds, occurrence, character of secretion; secretions, their composition, conditions exciting flow, influence of blood, etc; action of juices, conditions retarding and promoting rapidity; special action of pepsin, rennin, gastric lipase—intestinal digestion includes a similar study of the pancreatic juice, intestinal juices, and bile.
3. Paths of absorption of digested foods.
   Lacteal or lymphatic systems as carrier medium, necesssary conditions, foods absorbed, changes during absorption; the portal system as carrier medium, process, foods carried, changes.
4. Metabolism.
   Constructive, conveyance of foods to cell, importance of capillaries, building up of absorbed foods into living tissues; destructive decomposition of foods and liberation of energy, disposal of waste materials.
5. Products of metabolism.
   Tissues and secretions, excretory products, source of muscular energy, heat equivalent of some common foods.

MICROBIOLOGY

Microbiology shows the relation of cell growth, nutrition, and activity to organic development. The particular phase of biology emphasized is bacteriology, the purpose being to show the influence of simple forms of life, such as bacteria, yeasts, molds, etc., upon food materials, the human organism, and sanitary conditions surrounding both.

1. Life.
   Its purpose in the organization of materials.

2. Protoplasm.
   Physical and chemical nature, occurrence, properties, tests.
3. Cell.
   Unit of organization, occurrence, size, shape, composition, physiology of parts, advantages and purposes of cell structure. Relation to physical and chemical influence, nutrition, digestion and respiration.
4. Cell activity.
   Osmosis.
5. Cell growth.
   Formation, stages in nuclear division and cell division from mother to daughter cell, differentiation of cells into tissue, regions of growth, necessary conditions.
6. Reproduction.
   Sexual, asexual, meaning, development.
7. Higher fungi.
   Brief discussion showing economic relations and importance.
8. Molds.
   Nature of growth, when it grows, appearance, structure, reproduction; classification, germination of spores, methods of combating.
9. Mildews—kinds, place and time of development, method of reproduction, how checked.
10. Smuts.
    Their harm to grains, history, effects.
11. Yeast.
    Characteristics, classifications, conditions for growth, occurrence, use, combating wild yeast, fermentation and its effects.
12. Bacteria
    Form, size, shape, method of growth, rapidity of growth, spore formation, motility, classification, occurrence, conditions necessary for growth. Effects of bacterial growth demonstrated in the laboratory. Distribution of bacteria may occur through soil, water, air, foods. Methods of combating them are sterilization, use of preservatives, disinfectants, cold storage. The theory of germ diseases is discussed under the following topics. Channels of infection, susceptibility, disinfectants, deodorizers, antiseptics, heat, light. The formation of toxins and the use of antitoxins is illustrated in various diseases.

SEWING

The courses in sewing have a two-fold purpose, the first being to present a systematic, well-developed course of instruction that shall develop judgment and skill on the part of the student. The second purpose is professional, being to give a content from which courses of study may be organized and to show the development of the subject matter, its teaching possibilities, methods of presentation, and class management. The complete course includes model sewing, plain sewing, dressmaking, and art needle work.

MODEL SEWING

Model sewing includes a course in the making of models of the various steps in sewing to be preserved as illustrative material in teaching. Applications of the models are made upon articles of use and simple garments.

1. Canvas work.
   Samples of the various stitches, running, basting, etc.; applications to mats, bags, handkerchief cases, any small useful article upon which stitches may be used.

2. Hems and hemming.
   Paper and cloth models of straight, square corner, and mitred cornered hems, application on small pillow case or sheet.
3. Ruffles and bands.
   Practice ruffle set into band, application on small apron.
4. Darning.
   Weaving on cardboard to show warp and woof; stockinet darn on model, on worn stockings; cloth darns on models showing straight, bias, corner, patched darn; damask darn—diagonal, herring-bone, diamond, square, figured; applications made on worn garments.
5. Patching.
   Patches of various kinds, hemmed, catch stitched, overhanded, matching of stripes and plaids; application to garments.
6. Linen work.
   Plain and fancy hem stitching, French hemming.
7. Flannel work.
   Seams of various kinds, open and catch stitched, felled, bound; fancy stitches—feather stitch, coral stitch, chain stitch, blanket stitch; use of binding ribbon.
8. Button holes.
   On muslin with round corners, barred corners, overcasting; on wool with round corners, tailored corners, eyelets and loops.
9. Sewing on buttons, tape, hooks and eyes.
10. Trimmings for white work.
    Tucking, rolled edge, putting in insertions, laces, embroideries, fancy stitches used for trimming.

PLAIN SEWING

Plain Sewing consists of the making of a four-piece set of undergarments and any other simple garments for which there may be time. The garments are standard size, drafted to measures, and show in their finishing an application of the steps taught in model work.

DRESSMAKING

The purpose here is to teach the art of dressmaking—the use of a system of drafting by which patterns and designs are made, the designing of ordinary garments, the use of line, proportions, color, and adaptation of materials and to develop neatness, accuracy, self reliance, originality, and high ideals of work. The professional idea is also kept in mind.

1. Shirtwaists.
   Draft of plain shirtwaist and sleeve to different measurements in order to learn use of system; design of shirtwaist patterns in paper, three designs made to specific directions, two original designs; tailored shirtwaists designed and drafted from individual measurements; models of sleeve placket and cuff; cotton shirtwaist made from preceding designs and models.
2. Skirts.
   Drafts of skirts of prevailing styles; wash skirt made from designs and patterns from actual measurements; skirt designs in paper in full lengths; pressing of seams; woolen skirt made from pattern designed and drafted from actual measures and application of models.
3. Silk or wool waist.
   Design and draft from actual measures; selection of materials and trimmings; cutting, fitting and finishing of waist.
4. Morning dress of gingham, percale, or linen.
   Patterns and designs made to individual measurements and to suit individual style.
5. Lingerie dress of batiste, dimity, or other thin material.

ART NEEDLE WORK

Art needle work is planned to give training in the application of a knowledge of design and skill in fine needle work for the finishing or decoration of articles of clothing or house furnishing. The different lines of art needle work are considered under the heads given below and worked out upon articles chosen by the students.

1. Characteristics of design suited to various lines of needle work.
2. Design.
   Adaptation to particular line of needle work.
   Articles suited to kind of finish or decoration.
   Materials suited to finish, decoration, design.
3. Study of materials.
   Source, selection, combination, cost.
   Needle work stitches and finishing.
4. Kinds of work.
   Hem stitching, darning, applique, cross stitch, scallops and dots, Wallachian, cut work, eyelet, Bermuda fagoting, French embroidery, drawn work, ~~kish~~ crochet, knitting.

TRADE DRESSMAKING

The aim of the course is to prepare teachers for trade dressmaking classes and to afford students an opportunity to acquire skill in the designing, planning, cutting, fitting and finishing of garments. Each student drafts, cuts, bastes, fits, makes alterations, and finishes waist linings, shirt waists, sleeves, and skirt models Members of the class fit each other in working out the foregoing exercises. Trade work includes making of tailored skirts and waist suits, woolen and cotton dresses, silk, woolen, veiled and lingerie waists and gowns and any other suitable problems that may be brought to the school.

Lectures and class discussions accompany the practical work throughout the year. Some of the problems taken up are as follows:
Advantages and disadvantages of drafted and commercial patterns.
Drafting in elementary and secondary schools.
Study of trade schools, their purposes, courses of study, results.
Planning courses of study for trade school classes, for example, shirt waist class, or plain sewing class.

1. Drafting waist linings, sleeves, skirts.
   Purpose of, direction for, drafting patterns, testing, seams, allowance, tracing, cutting.
2. Designing.
   Using foundation patterns, designing pleated, draped or fancy waists, sleeves, skirts, dresses, making paper, cambric or cheese cloth patterns of same.
3. Cutting.
   Placing pattern, pinning, marking, cutting, basting.
4. Fitting.
   Objects to be considered; elementary directions for normal and abnormal figures.
5. Finishing.
   Waist linings, i. e. seams, plackets, hooks and eyes, buttons, lining, belting.
   Sleeves, including seams, plackets, cuffs.
   Skirts, including seams, belt, placket, hems, plaits, and tucks.
6. Draping.
   Arranging in foundation linings, skirts, yokes, collars, sleeves, waists.

7. Costume Design.
   Study of lines and harmony; fabrics, suitability, utility, trimmings; designing for patrons.

MILLINERY

Designing, making, trimming, and decorating of fall and spring hats with a view to developing originality, invention, and skill are the main purposes of this course. Stress is placed upon the artistic side of the work by study of the harmony of color and line. The practical side is also taught by emphasizing economy in the utilization of old material by renovating and tinting. Distinction and individuality in the product are secured by the making of flowers, ornaments, and other trimmings. Suggestions for the adaptation of the work to high schools, and to continuation and trade school classes are made throughout the course.

1. Wire work for fall millinery.
   Bandeaux, stocks, buckles, frames. Design of frame, handling wire, cutting, fitting, and fastening.
2. Tinting and renovating materials.
   Gasoline, oil paints, dyeing, selection and use of colors.
3. Millinery stitches.
   Running, back, overcast, feather, button-hole, slip, catch, saddler's stab, lacing.
4. Folds.
   Milliner's and French.
5. Flower and bow making and trimming.
   Making of roses and violets; tissue paper bows, even and uneven loops, rosettes; use of silk ribbon, maline, and lace; making of buckles and cabachons.
6. Buckram frame.
   Designing of hats, shaping of material, finishing frame; covering, trimming, lining.
7. Street hat for spring millinery.
   Wire frame, covering, straw sewing, trimming, finishing.

TEXTILES

The purpose of this course is to give a practical understanding of the various textile fibres and processes of their manufacture that shall lead to judgment and taste in selections suited in wearing quality, adaptability to use, permanence of color, and harmony of design to the particular use for which they are intended.

1. Development of preparation of fibers.
   Spinning, its history, processes, present methods; weaving, early forms, movements in weaving, kinds of looms; weaves and kinds of cloths in which used, plain, twill, sateens, rib, basket.
2. Study of fibers.
   Vegetable fibers—plumose, cotton, flax, hem, jute, ramie; animal fibres—silk, wool; mineral fibers—asbestos.
3. Cotton.
   Distribution and production as influencing quality and cost, steps in handling, operations in milling, products of milling, characteristics, adaptations to use, prices, wearing qualities.
4. Flax.
   Practically same as above, adding a comparison of linen and cotton in price, appearance, and wearing qualities.
5. Silk.
   Characteristics, treatment of cocoon, milling operations, artificial silks, milling products, same points as in cotton.

6. Wool.
   Practically same as silk.
7. Dyeing.
   Definition, effect upon fibers, elements, color, mordant, assistants.

DRAWING AND ART WORK

Lines of work include the subjects and modifications of subjects needed by the student to carry on practical applications of house planning, furnishing, use of design, use of color.

MECHANICAL DRAWING

A course of lectures and the making of drawings are included as a part of the regular work in preparation for teaching the household arts in public schools. A series of exercises is given to develop suitable technique and familiarity with drafting conventions, and these are followed by the making of working drawings of pieces of school equipment and layouts of school rooms. The course ends with the making of plans and elevations of small cottages and a study of building details and conveniences.

1. Lettering exercise,—giving special attention to the proper proportions of a suitable type of lettering for the making of working sketches and simple mechanical drawings.
2. Line exercise,—providing opportunity for practice with the various kinds required in common drafting usage.
3. Projection drawing,—representing solid objects shown in three views and completely dimensioned.
4. Working drawing of stand,—designing pieces of furniture and putting dimensions upon details of construction.
5. Kitchen table,—making of drawing of table suitable for use in domestic science classes.
6. Storage cabinet,—determining desirable arrangements, study of construction, making of complete drawing.
7. School kitchen,—location of doors and windows, placing of furnishings, making of scaled architectural sketch of scheme.
8. Plan of cottage,—studying problem of house planning, determining size and shape of rooms, considering conveniences and constructive details, use of architectural conventions.
9. Elevation of cottage,—selecting type of exterior suitable for style of cottage, examination of exterior details, making of front and side elevations.
10. Interior wall arrangements,—adjusting paneling and other woodwork to use and attractive appearance, developing four walls of one room.
11. Two story frame house,—sketching plans and elevations for modest dwelling.
12. Perspective,—drawing in perspective to show more real appearance of objects.

DRAWING AND DESIGN

Drawing and design include such principles of design, color, and sketching as are needed in carrying out the lines of work. Only work having direct application is undertaken as the purpose is practical rather than professional.

1. Drawing.
   Life and object, still life studies, selected from objects, to be used for illustration, life from the human figure.
2. Design.
   Spacing and proportion, the use of stripes, plaids, squares, oblongs, triangles, circles;

surface design—spots, borders, stencils, block printing, embroidery, applique, darning.
3. Color.
   Composition, harmony by analogy and contrast.
4. Millinery.
   Drawing frames, bows, trimmings, original designs, color combinations.
5. Garment making.
   Sketching from life and object; underwear, design and trimming; costume designing, proportions, color combinations.
6. Blackboard illustrations.
   Presentation of subject matter.

INTERIOR DECORATION AND FURNISHING

The purpose of this course is two-fold, to prepare students to create an artistic home environment, and, out of their knowledge of the basic principles of art and good design as applied to interiors, to evolve a course of study that can be successfully carried out in puplic schools under present conditions and find direct application in the homes of the pupils.

1. Design.
   Nature applied to design, historic ornament, original designs and adaptations; applied design—wall decorations, stencils, block work.
2. Color.
   Composition, harmony, light, physical effects, psychological effects.
3. House planning.
   For convenience, for artistic effect. Each pupil is required to plan a house of a given number of rooms at a given cost and must carry out her plans in detail, showing floor plans, elevations, and views of the interior, showing color schemes, decorations and furnishings.
4. House decoration and furnishing.
   Color combinations suited to design and use; finishes for walls, floors, woodwork; textiles used for floor coverings, hangings, curtains, cushions; ornaments—pictures, pottery, china, bric-a-brac; furniture—use, materials, form and ornamentation.

PROFESSIONAL SUBJECTS

It is necessary that the students understand the professional as well as the practical and economic bearing of the subject. Many of the training possibilities of the various lines of work are emphasized in the regular course of instruction, attention being called to the mental processes involved, the specific training value, the organization of material, the presentation of subject matter, using the regular class work to illustrate processes. The actual organization and handling of the public school classes of different grades gives opportunity to acquire, at first hand, knowledge of the stages of development of pupils of different ages.

The professional work may be included in the following general topics, psychology and pedagogy, observation and practice teaching, a study of the organization and management of classes, and of the organization of courses of study and planning of equipment.

PSYCHOLOGY AND PEDAGOGY

See under Manual Training Outline of Courses for scope of work.

OBSERVATION AND PRACTICE TEACHING

See under same heading, Manual Training page 16.

GENERAL ORGANIZATION AND MANAGEMENT

The following course has as its aim the working out of the relation of the subjects of instruction included in a complete home economics course and the indicating of the peculiar training possibilities of each line of work as well as the organization of practical information needed by a teacher in introducing or conducting the work.

1. History and status of Home Economics in schools.
2. Practical and educational purposes in its teaching.
3. Scope of the subject; sciences
   Chemistry, physiology, biology, physics, art—use of color, design, house decoration, designing of costume, economics—relation of home to surroundings, social and industrial
4. Place in course of study.
   Relation to other lines already taught, sequence of work as determined by psychological and physical principles.
5. Planning of courses of study.
   Influence of environment, development of pupil, possibilities of school system.
6. Organization of classes.
   Records, attendance, standard of class marking,
7. Presentation of subject matter.
   Preparation for lesson, lesson plan, preparation of materials, presentation, theoretical treatment, method of conducting, practical application.
8. Study of equipment; rooms.
   Plans, dimensions, furnishings—kinds, cost, where obtained.
9. Cost of maintenance.
10. The special teacher.
    Attitude toward other lines of work, relations with regular teachers, supervision and conduct of teacher's classes.

GENERAL SUBJECTS

Under this head are grouped subjects that do not logically fall under the other main headings.

EMERGENCIES AND HOME-NURSING

This course gives the practical treatment of simple ailments of the human body and methods of handling emergencies that may occur in the home, the school, or elsewhere.

1. The sick room.
   Location, furnishing, ventilation, care.
2. Beds and bed-making.
   Lifting and handling patient.
3. Baths and bathing.
4. Observation of temperature, respiration, pulse, administration of medicines.
5. Local applications.
   Plasters, poultices, blisters and other counter-irritants, hot and cold compresses.
6. Contagion and disinfection.
   Infectious diseases, modes of propagation, fumigation and disinfection.
7. Emergencies.
   Fainting, drowning, scalds and burns, frost bites, hemorrhage, sprains and fractures, poisons and antidotes.
8. Bandaging.
9. Study of diseases.
   Tuberculosis, typhoid fever, colds, etc.

HOUSEHOLD MANAGEMENT

Household management furnishes an opportunity to assemble the numerous lines of instruction and fields of experience necessary to administer the affairs of a household into one general course. The primary purpose of this line of work is to show the relations of science, art, economics, and their practical application.

Because of the scope of the subject and the necessity for little equipment in its teaching, household management presents greater teaching possibilities than many lines of instruction. The development of the subject, its training value, and methods of presentation are included as a part of the instruction.

1. House Sanitation.
   Location, site, drainage, water supply
   Heating, lighting, ventilation
   Cleaning processes.
2. Finishes and Furnishings.
   Floors, floor finishes, floor coverings
   Walls, wall finishes and coverings
   Windows, shades, draperies
   Suitable furnishings for various rooms in the home under various conditions
   Advantages and disadvantages of kinds and quality of finishes and furnishings with regard to sanitation and economy and necessary care of same.
3. Household Expenditures.
   Need of business management in the home
   Classification of expenditures, division of income
   Methods of purchase, keeping of accounts, paying of bills
   Discoveries of leakage in household expenditures
4. Household Organizations.
   Necessity of system in the household
   Division of labor, daily and weekly schedule
   Discussion of household service problems, an attempt to answer these questions:—Who shall do the work? When, where, and how shall it be done?
5. Pedagogical Problems.
   In connection with each subject attention is given to the practical application of the above problems, not only for the home, but also as to the best methods of presenting the work to public school classes.

ENGLISH

English as given in connection with the Domestic Science courses is designed to aid the student to overcome bad habits of speech and writing. Oral topics relating to the special subject form the nucleus of the recitation work. For written work, daily paragraph themes illustrating various methods of presentation and exposition are required for the larger part of the course, outlines for all oral topics are prepared, and at least one long theme is written. In the paragraph theme attention is paid to matters of punctuation and correctness of idioms rather than to grace of style.

PHYSICAL TRAINING

Opportunity is offered to students for physical training in regular classes in the gymnasium and natatorium.

ELECTIVES

In the selection of electives students will advise with and secure approval of the director of the department.

THE HOMEMAKERS SCHOOL

GENERAL STATEMENT

This school is a department of The Stout Institute maintained for the purpose of preparing young women, who do not wish to teach, for the responsibilities of the homemaker.

THE WOMAN IN THE HOME

Economic, scientific, artistic, and ethical conditions are involved in the making of a home. The home is the dwelling place of the family, the abiding place of affections. "Home is the sacred refuge of our life."

Within the home the children are reared; its influence and the environment it creates are potent factors in the development and shaping of the life of every member of the family, and in determining their usefulness as members of society and as citizens of the state. The family is a business organization, the social unit, and an ethical force.

The making of the home tests the efficiency of the family as a business organization, fixes its character as a social unit, and determines its potency as an ethical force.

The woman is the administrative officer of the family as a business organization; the man should provide the funds for carrying on the business of homemaking; the woman should disburse these funds in such manner as to secure the desired results for the family and the home.

The best results cannot be secured in this organization unless both the man and woman perform their respective functions with the highest degree of efficiency. The function of neither can be performed without adequate preparation.

Society has provided, and is providing more and more completely, the means through which the man may secure proper preparation for the successful discharge of his function as provider for the family, through his skill as a worker in the professional, commercial, or industrial field of activity. Professional schools, commercial schools, technical schools, and trade schools are being organized in increasing numbers to provide the training necessary for increasing the earning capacity of the man.

Society has failed to recognize what an important factor the woman is in the family as a business organization, has not appreciated the variety and extent of the demands made upon her in the proper administration of household affairs, and therefore has failed to realize the importance of providing means for her training for efficiency in the home. The schools open to her, however comprehensive in their courses for formal discipline and cultural values, have made little or no provision for a consideration of those subjects which are of vital importance to the woman who is some day to assume the responsibility of making a home for herself and family.

If her mother possesses the necessary knowledge of economic, scientific, artistic, and ethical principles underlying the wise administration of the affairs of the home, the necessary technical skill in applying these principles, ability as a teacher, inclination to teach her daughter, and time and strength for her teaching, and if her daughter, after the discharge of her school and social duties, has the strength, time and inclination to profit by her mother's instruction, well and good. In very few homes in this country, however, do these conditions exist, and therefore, few of the girls in these homes are getting the training so essential for the success and happiness of their lives, and of the lives of others in the home.

In most cases the girl goes from the school, with such of the stereotyped academic training as opportunity and application have given her, yet which has touched but lightly, if at all, upon the vital affairs of her life, to enter a new home and become an active partner in its business organization, to assume at once the cares, duties, and responsibilities of the homemaker. From a life of limited responsibilities and cares, she passes at once into another whose responsibilities fail to appall her, solely because of her ignorance of what is involved in the change.

A SCHOOL FOR HOMEMAKERS

The Stout Training School for Teachers of Domestic Science and Art was established in Menomonie, in 1903. The demand for the graduates of that institution as teachers of domestic art and science in the public schools shows an awakening of public interest to the importance of these subjects, and to the necessity for definite instruction in them beyond what is afforded in the home.

The time limit likely to be placed on these subjects in the public school curriculum for some years to come, even under favorable conditions, will necessarily confine the instruction given to elementary phases, but valuable as it will prove, it will not fully meet the needs of those who wish to make thorough preparation for the responsibilities imposed by the care of the home.

Experience in the adminstration of The Stout Institute disclosed the fact that there are many young women who do not wish to take the technical and professional training necessary to fit them for teaching, but who would be glad to avail themselves of the opportunity for the acquisition of the practical knowledge and training which a high grade school for homemakers should offer.

A realization of this demand and deep-seated conviction of the importance of this phase of educational effort, coupled with a recognition of its close relation to the lines of educational work already successfully inaugurated in Menomonie, led to the decision to open such a school as a department of The Stout Institute in September, 1907.

The organization of this school was made possible through the public spirit of the late Hon. J. H. Stout, whose deep and practical interest in various phases of industrial education in elementary and secondary schools is well known.

The school has been in existence five years. The character of the work done by the students who have completed the course, their estimate of its value, and the favorable judgment expressed by scores of intelligent men and women from all parts of the country, who have visited the school,

studied its plan of organization, and observed its work, all combine to approve the action of its founders in organizing the school.

No attempt has been made to secure a large attendance, because much of the work was in an untried field, and while it was being organized it was felt that better results could be secured by the individual student if the attendance were limited, than with a larger number of students. This policy will be continued for another year, chiefly because of the rapid growth of the other departments of the institute and the consequent limited accommodations available for the homemakers' school.

It is hoped that in the near future new buildings may be provided thus making it possible to remove the limit on attendance.

A bulletin giving detailed information concerning the courses offered in this school will be sent upon application.

TRADES SCHOOL

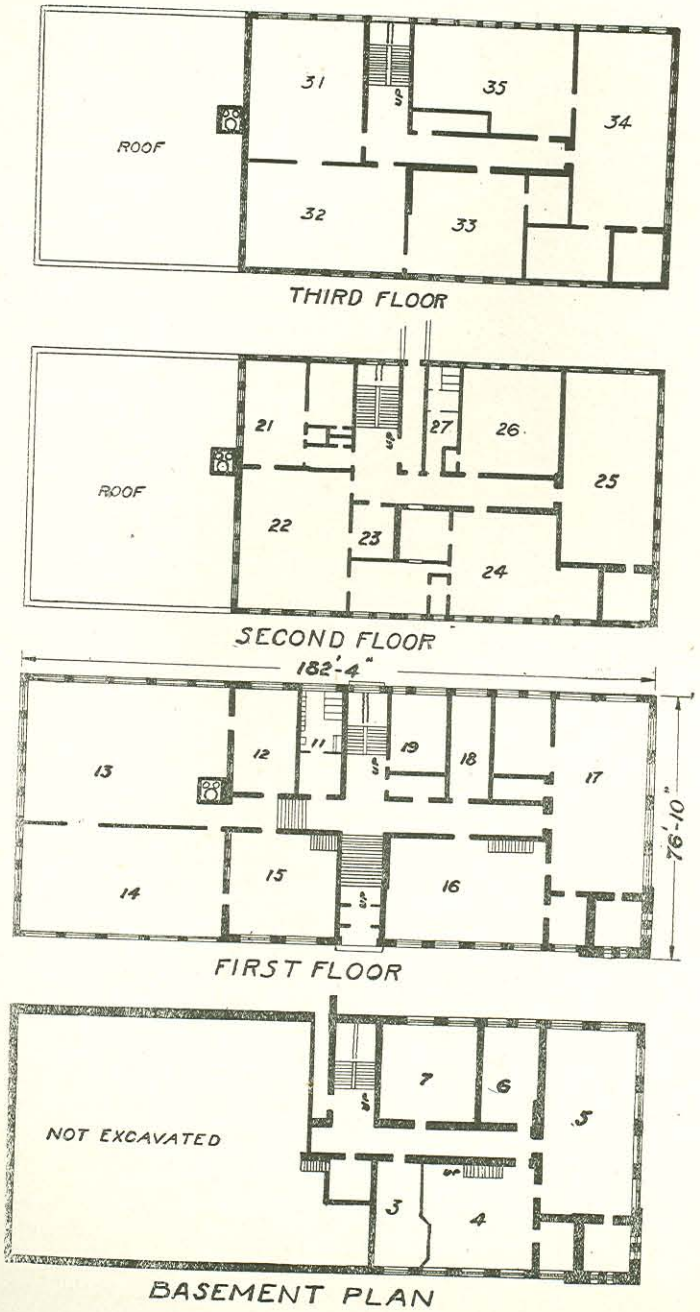
PLUMBING AND BRICKLAYING TRADES

This school is organized to meet the demand for men in the trades who possess the necessary technical knowledge, and skill in applying that knowledge through modern methods in construction work. Young men are able to secure this theoretical and practical training under competent instructors in much less time than under the apprenticeship system. Even when the apprenticeship conditions are most favorable, but little knowledge of the fundamental principles underlying the correct trade processes are ever acquired by the apprentice. With the instruction and practical training given in this school, its graduates are able to command good wages at once, and to become skilled workmen within a short time after completing their course of instruction in the school. It is not claimed that the completion of either of the courses in the school will entirely take the place of practical experience in the trade, so necessary for the skilled mechanic, but that these courses of instruction, when mastered, materially shorten the time required for a full mastery of the trade, and give a much better knowledge of the principles which determine the best trade processes and practice than can be obtained in any other way.

The kind of training which this school gives not only fits men to follow directions intelligently and skillfully, but to plan and lay out work, to estimate materials and cost, and to give directions to others,—important matters for those who would become foremen, superintendents, or contractors. The demand for skilled men in these two trades is steadily increasing and insures ready employment at good wages for those who complete either of the courses, and rapid advancement when the school training has been supplemented by a reasonable amount of experience.

The work in each department is designed to meet the needs of the man who has already done some work in the trade as a workman, but who wants to strengthen and broaden his preparation through systematic instruction and training adapted to his special needs. It is also designed to meet the needs of the man who has no knowledge of the trade processes or of the principles underlying them and who wishes to take the necessary steps to become a skilled workman with capacity for leadership, in the shortest possible time.

A special circular of information gives details of these courses. A copy will be sent upon request.



KEY TO BUILDING PLAN

SHOWN ON OPPOSITE PAGE

BASEMENT PLAN

Room No. 3. Engine Room.
4. Planing Mill.
5. Cabinet Making Shop.
6. Dry Kiln and Storage for Lumber.
7. Locker Room and Lavatory.

FIRST FLOOR PLAN

Room No. 11. Locker Room and Lavatory.
12. Cupola Room.
13. Forge Shop.
14. Machine Shop.
15. Molding Room.
16. Wood Turning and Pattern Making Shop.
17. Elementary Woodworking Shop.
18. Print Shop.
19. Manual Training Office.

SECOND FLOOR PLAN

Room No. 21. Sewing Room, Home Economics Office connected.
22. Dressmaking and Drafting Room.
23. Teachers Conference Room.
24. School Kitchen.
25. Mechanical Drawing Room.
26. Lecture Room.
27. Locker Room and Lavatory.

THIRD FLOOR PLAN

Room No. 31. Biological Laboratory.
32. Sewing Room.
33. Millinery and Art Needlework Room.
34. Free hand Drawing Studio.
35. Lecture Room.

ROOMS USED IN OTHER BUILDINGS

Kitchen A.
Kitchen B.
Kitchen C.
Homemakers Kitchen Laboratory.
Chemistry Laboratory A.
Chemistry Laboratory B.
Chemistry Laboratory C.
Trade Dressmaking Room.
Three Woodworking Shops.
Bricklaying and Cement Shop.
Plumbing Shops.
Gymnasium and Natatorium.
Several Recitation Rooms.
Library and General Office.

SUMMER SESSION COURSES

The following courses are offered for the Summer Session, 1913. The school opens July 28, and closes August 29. Forty-six courses are offered in the manual arts, and twenty-two in the household arts.

MANUAL ARTS COURSES

THREE GENERAL COURSES

Organization of Manual Training
Industrial Economics
Shop courses and Equipment

ELEVEN DRAWING COURSES

Elementary Drafting
Professional Drawing
Machine Sketching
Machine Drafting
Architectural Sketching
Architectural Drafting
Architectural Details
Interior Decoration
Pencil Sketching
Elementary Design
Furniture Design

TEN METAL WORK COURSES

Professional Forging
Elementary Forging
Agricultural Forging
Tool Smithing
Art Smithing
Jewelry and Silver Work
Hammered Copper Work
Machine Shop Practice
Foundry Practice
Millwrighting

TWELVE COURSES IN WOOD-WORKING

Mill Work
Elementary Carpentry
Carpentry Construction
Joinery
Wood Turning
Elementary Cabinet Making
Case Construction
Wood Finishing
Varnishing and Polishing
Elementary Pattern Making
Advanced Pattern Making
Elementary Woodwork

TEN OTHER MANUAL ARTS COURSES

Primary Handwork
Clay Modeling
Pottery Making
Elementary Printing
Advanced Printing
Cement Work
Bricklaying
Plumbing Practice
Plumbing Theory
Photography

HOUSEHOLD ARTS COURSES

THREE GENERAL COURSES

Organization of Domestic Economy
Household Management
Home Nursing

EIGHT DOMESTIC ART COURSES

Plain Sewing
Model Sewing
Art Needle Work
Millinery
Dressmaking
Cutting and Fitting
Textiles
Costume Design

SIX FOODS AND COOKERY COURSES

Food Study I
Food Study II
Elementary Cooking I
Elementary Cooking II
Advanced Cooking
Dietetics

FIVE SCIENCE COURSES

General Chemistry
Food Chemistry
Chemistry of Nutrition
Household Chemistry
Microbiology

FURTHER INFORMATION

Inquiries regarding the purpose and character of work offered at The Stout Institute, the regular courses of study or those of the summer session, the Bulletin and other publications of the school, or inquiries regarding the qualifications of Stout graduates for the teaching of special subjects, should be addressed to

L. D. HARVEY
President The Stout Institute
Menomonie, Wisconsin

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CALENDAR FOR 1913-1914

Eighth Annual Summer Session begins July 28, 1913

Eighth Annual Summer Session ends August 29, 1913

Eleventh Regular Session begins September 8, 1913

Holiday vacation---December 20, 1913-January 4, 1914

First semester ends January 23, 1914

Second semester begins January 26, 1914

Spring vacation---March 28, 1914-April 5, 1914

Eleventh Regular Session ends June 5, 1914